AN INVESTIGATION OF THE PSYCHOLOGICAL AND PSYCHOSOCIAL CORRELATES OF BEHAVIOUR PATTERNS ASSOCIATED WITH CORONARY HEART DISEASE

A thesis

submitted in partial fulfilment

of the requirements for the Degree

of

Master of Arts in Psychology

in the

University of Canterbury

by

Carolyn Joan Marquand, B.A.

University of Canterbury

1978

ACKNOWLEDGEMENTS

Firstly I wish to thank Doctor Robert Hughes, Ph.D., of the University of Canterbury in his role as my thesis supervisor, but in particular for his assistance in the statistical analysis.

Secondly I owe much to Doctor Rosemary Ikram, MB.BS., of Christchurch; who contributed to the original thinking that resulted in the research for this thesis, for her encouragement and medical advice.

I am also grateful to the Royal New Zealand Army for the granting of the time to complete this work; to my two Corp Directors, Lieutenant Colonel L Jones, ARRC. QHNS. Dip N., (retired) and Lieutenant Colonel H.J. Macann, ARRC. QHNS. Dip N.; and to the various army officers of Burnham Military Camp for their continuing support.

Finally to the residents of Rolleston for completing the surveys, for without their cooperation this thesis would not have been possible.

CONTENTS

LIST OF TABLES

GRAPHS

ABSTRACT

A brief introduction to the concept of coronary risk factors was made, and the literature concerning the coronary prone behaviour pattern and its possible associated psychological and psychosocial correlates was reviewed.

A semi structured questionnaire using a mailed survey was used to establish the prevalence of this behaviour pattern in a New Zealand sample. The questionnaire included the Vickers and Bortner self rating scales, the Bendig Anxiety and Welsh Depression Sub-Scales of the MMPI, as well as originally designed questions based on known psychological and physiological risk factors.

No significant relationship was found between the Vickers and Bortner scales. Anxiety and depression were found to be characteristic of Type A behaviour pattern, and other variables were found in varying degrees but were not significant to the main findings. The results were compared to those found in the United States and to the only other study completed in this area in New Zealand.

The implications of this work are commented upon, and suggestions for further research noted.

CHAPTER I

INTRODUCTION

Coronary heart disease (CHD) represents the most frequent reason for deaths in the western world (Stockmeier, 1976.), and is the commonest cause of death in New Zealand (Department of Statistics, 1977.) and in most cases of CHD atherosclerosis is the underlying causative factor. Unfortunately it is almost impossible apart from coronary arteriograms to establish with certainty the presence or extent of atherosclerosis until the clinical manifestation of CHD (myocardial infarction (MI)) presents itself, by which time it is obviously far too late to attempt preventive medicine.

What is required therefore, is some method of being able to predict which persons are likely to be most susceptible to atherosclerosis and / or CHD. Thus the concept of 'coronary risk factors' has come to the fore in recent years. Coronary risk factors are those abnormalities[1] demonstrable in persons free of CHD that are known to be associated with a significantly increased risk of developing the disease in subsequent years (Stamler, 1967.). This does not necessarily mean they are

---

1 Since men are in general much more susceptible to CHD than women - being a man is designated as a 'coronary risk factor' - although it would hardly be acceptable as an abnormality.

causative factors, but they are factors known to be associated with a higher than normal incidence of the disease.

Thus it is possible to prepare a 'coronary profile' for each person based on his or her status with respect to each of these risk factors and the more factors taken into account in this coronary profile the better its predictability. It then becomes possible to state quantitatively with a reasonable degree of accuracy at this stage of our knowledge what a given person's probability of developing clinical CHD is in the future. The important thing to note however, is that many persons with high profiles will 'not' develop the disease and that some people with low profiles 'will' develop it. So no predictive index yet devised is perfect. Nevertheless, extensive data now clearly demonstrate that while findings do not permit an absolute prediction on the basis of an individual CHD profile, accumulated knowledge from a large number of international epidemiological studies, extensive animal experiments, and research by clinical investigators and cardiologists indicate that much progress has been made. Consequently there are substantial practical and theoretical implications in relation to the aetiology, pathogenesis and prevention of CHD by the application of this latest research knowledge in lowering the possible risk factors (Editorial, 1974; Corday, 1975; Kannel, 1976; Swartz, 1978; Whitaker, 1969.).

Those major risk factors most highly associated with CHD have been extensively studied and are outlined below.

These include levels of circulating cholesterol, triglycerides, lipoproteins and saturated fats (Blacket et al, 1973; Carlson and Bottiger, 1972; Department of Health and Social Security, 1974; Jones, 1973; Kannel et al, 1971; Miettinen et al, 1972; Miller et al, 1977; National Heart Foundation of New Zealand, 1971; Reiser, 1973; Stamler, 1967; The Royal Society of New Zealand, 1971.).

Cigarette smoking has also been overwhelmingly linked to CHD. These studies include for example, the Evans County, the Framington, and the Western Collaborative Group Studies (WCGS) on cardiovascular diseases as well as numerous other studies of a smaller magnitude. The degree of risk is positively correlated with the number of cigarettes smoked, while the use of a pipe or cigars in moderation is only associated with a minor increase in coronary proneness (Gordon et al, 1974; Heyden et al, 1971; Heliovaara et al, 1978; Kannel, 1976; National Heart Foundation of New Zealand, 1976; Rosenman et al, 1964; 1966; 1970; 1975.).

Investigators have also indicated a relationship between hypertension, (high blood pressure) although the direct causal relationship of this alone does not appear

to be so well established. (Bergland et al, 1978; Chapman and Massey, 1964; Kannel et al, 1961; Kannel and Dawber, 1974; National Heart Foundation of New Zealand, 1976; Stamler, 1967; 1973; The Royal Society of New Zealand, 1971.).

Obesity is also a related factor (Ashley and Kannel, 1974; Kannel et al, 1974; Keys et al, 1972; Stamler, 1967.); as is a lack of exercise or what has been called 'sedentary living habits' (Cassel, 1971; Fletcher and Cantwell, 1974; Morris et al, 1973; Noakes and Opie, 1976; Wilhelmsen et al, 1976.).

A positive family history must also be regarded as significant (Bloor, 1972; Editorial, 1977; National Heart Foundation of New Zealand, 1971; Oschwitz, 1968; Stamler, 1967; The Royal Society of New Zealand, 1971.).

Several other abnormalities are also implicated as coronary risk factors although the data with regard to these is not as comprehensive nor as consistent as with the foregoing. These less well substantiated risk factors include diabetes mellitis (Bengtsson, 1973; Garcia et al, 1974; Kessler, 1971; Stamler, 1972.); oral contraceptives (Friedlander and Snell, 1975; Mann et al, 1975a; 1975b; Radford and Oliver, 1973.); water hardness and trace metals (National Heart Foundation of New Zealand, 1971; 1976; The Royal Society of New Zealand, 1971.);

electrocardiograph abnormalities (Stamler, 1967.); inadequate sexual activity (Schienman, 1974.); and alcohol, which in fact has been negatively correlated with CHD, a point of interest considering New Zealand has one of the highest alcohol consumption rates in the world (Department of Statistics, 1977; Klalsky et al, 1974; Mathews, 1976; Myrhed, 1974; National Heart Foundation of New Zealand, 1971.).

Finally there is the implication of a particular personality or behavioural pattern and its associated psychological and psychosocial factors that may present as a coronary risk factor. In fact, for some theorists this is the 'connecting link' and may well be the key cause of CHD (Friedman and Rosenman, 1974.).

It is these last factors which form the subject of this thesis. This present research investigates the psychological and psychosocial correlates of a particular behaviour pattern that may later be associated with CHD and which therefore, may present as a coronary risk factor on a profile prior to the clinical manifestation of the disease.

I. GENERAL INTRODUCTION

In contrast to the considerable attention that has been paid to the possible risks of various physiological characteristics and habits, for example, cholesterol levels, hypertension, obesity or smoking as precursors to CHD, comparatively little emphasis has been placed on the psychosocial associations that might be associated with CHD as risk factors until the last fifteen years or so. The term 'psychosocial' incorporates the psychological and social characteristics of the individual which are relevant to his psychological and social development and status; and more importantly, the transactions which occur between the individual and his environment (National Heart Foundation of New Zealand, 1976.). Most of this work has been under the auspice of 'behaviour patterns'. In fact the original proponents of the specific behaviour pattern now designated as Type A note:

> '...the layman...has unfortunately been denied the most important information of all; the facts about what we believe to be the major cause of premature CHD. ...In the absence of Type A Behaviour Pattern, CHD almost never occurs before 70 years of age, regardless of the fatty foods eaten, the cigarettes smoked or the lack of exercise. But when this behaviour pattern is present, CHD can easily erupt in one's thirties or forties'.
>
> (Friedman and Rosenman, 1974, Preface.)

Today the weight of evidence supporting the role of behavioural factors in CHD is so impressive it must be accorded the status of a possible risk factor (Byrne and Henderson, 1976.).

Other studies have isolated aspects of the subject's personality characteristics such as anxiety, depression, or transactions characterised by their stressful nature such as life changes.

Despite the fact that an important amount of evidence has now been accumulated implicating psychological and social factors in the clinical manifestation of CHD and the high morbidity and mortality experience of that disease history in New Zealand, and notably the Maori, (Beaglehole and Prior, 1975; Department of Health, 1975; Department of Statistics, 1977; National Heart Foundation of New Zealand, 1976; Stanhope and Prior, 1975; The Registrar General's Office, 1901.) until very recently (Bianci et al, 1977, 1978; Spicer, 1977b, 1978a, 1978b; Spittle and James, 1977.) little data was available on either the prevalence or pattern of these risk factors in New Zealand.

II. NATURE AND SCOPE OF THE INVESTIGATION

This present study is an investigation of the psychological pattern of behaviour referred to in the literature as 'Type A Behaviour Pattern' using two different measures; the Vickers self rating scale, (Vickers, 1973) and the Bortner self rating scale (Bortner, 1969). It documents the relationship of these two measures and then examines two personality characteristics. The first, anxiety, using a modification of the Bendig sub scale of the Minnesota Multiphasic Personality Inventory, (MMPI) and the second, depression, using a modification of the Welsh sub scale of the MMPI. An attempt will also be made to relate other psychosocial characteristics associated with life style such as occupation, economic status and education, while the physiological variables of cigarette smoking, exercise and alcohol consumption have also been included as possibly related to the main findings.

This work in part replicates aspects of the only other study completed in this area in New Zealand to date (French, 1974; McLeod, 1974; 1975a; 1975b; Spicer, 1977a; 1977b; 1978a; 1978b; 1978c; 1978d.) although a different technique in data collection was utilised.

Using a mailed survey a semi structured questionnaire on life style was completed, and this was followed by the respondents filling in the four self rating scales. Survey respondents were from Rolleston, a commuter suburb of Christchurch.

These procedures are discussed in full in Chapter three, Materials and Methods.

CHAPTER II

REVIEW OF THE LITERATURE

As early as the eighteenth century physicians recognised that emotional factors may play a causal role in the pathogenesis of CHD, a fact sporadically reported but remaining in the background until the 1950s. The development of this concept began with the more recent work of the cardiologists Meyer Friedman and Ray Rosenman in the 1950s as a result of a study of the pertinent literature and private consultations of their own patients for over a decade. They suspected that despite the apparent associational relationships between the incidents of CHD and factors such as dietary foodstuffs, serum lipids, cigarette smoking, physical inactivity and heredity factors, there were enough exceptions to such relationships to suggest the possible presence of another as yet unidentified aetiological factor. Another important fact that aided this early research for an alternative answer was the apparent immunity of American white females in San Francisco to CHD. Conjecture that it might be her relative protection from the rigors of the socio-economic millieu her partner was being ever increasingly exposed to led to a search for an identification of the common emotional traits now described as the Type A Behaviour Pattern (Friedman and Rosenman, 1974;

Rosenman, 1974; Rosenman and Friedman, 1974.). Unfortunately this concept was not initially very readily accepted by research cardiologists largely because of its resistance to precise objective measurement. Today however, numerous publications convincingly support this hypothesis.

I. TYPE A BEHAVIOUR PATTERN

The Type A Behaviour Pattern is so deeply ingrained in our society as to be almost a characteristic of it. It is an action packed emotion complex that can be observed in any person who is aggresively involved in a chronic, incessant struggle to achieve more and more in less and less time often against the opposing efforts of other things or persons and this chronic struggle is a socially acceptable - indeed often praised - form of conflict. (Friedman and Rosenman, 1974.).

This coronary prone behaviour pattern is characterised by an overt behaviour syndrome or style of living expressing competitiveness, striving for achievment, aggressiveness, (sometimes stringently repressed) a sense of time urgency, acceleration of common activities, restlessness with an inability to relax, hostility, hyperalertness, explosiveness of speech, muscle tenseness, and an insensitivity to the environment. This 'torrent of life' is usually but not always channeled into a

vocation or profession and can often result in neglect of other aspects of life such as the family or recreation. Notably a person need not possess all of these characteristics to be Type A, and the pattern is not a personality trait or stress reaction but is rather, the observable behaviour that emerges when a person predisposed by this characterisation is confronted by a 'triggering situation'. In other words, the environmental challenge must always serve as the fuse. Not only that, the Type A person rarely despairs of losing his struggle but confidently advances to grapple with his challenges as they arise (Friedman and Rosenman, 1974.).

Our contempory western environment has in many ways encouraged the increasing prevalence of the Type A Behaviour Pattern because it appears to offer special rewards (or what Skinner would call 'reinforcement' (1938.)) to those who can think, perform, communicate, and in general live a life much more full than their counterparts (Friedman and Rosenman, 1974; Jenkins, Rosenman and Zyzanski, 1974; Rosenman, 1974.).

Friedman and Rosenman's (1974) portrayal of the Type A character as they have sketched it is revealing:

> 'If you have a habit ... of vocal explosiveness... feel impatient at the rate of which most events take place... become unduly irritated... constantly think of or do two or more things simultaneously... find it difficult to refrain from talking about the subjects which especially interest you... and no longer observe or enjoy the lovely objects of your millieu... schedule more into less time... then you may well be the fully developed hard core Type A Behaviour Pattern.
> (p83-85)

They go on to suggest this type of emotional behaviour in the long run results in a number of physiological changes. There is a chronic excess discharge of catecholamines from the nerve endings and hormones from the pituitary, adrenal and pancreatic glands resulting in an increased blood level of cholesterol and fat. With the lag in ridding ones blood of this, and an increased tendancy for the clotting elements of the blood to precipitate out intravascular depositioning and narrowing occurs causing arterial deterioration - all of these abnormalities set in motion by the presence of the Type A Behaviour Pattern. (p 178) A fact that has now been validated by experimental control (Friedman, Rosenman and Byers, 1964.).

II. TYPE B BEHAVIOUR PATTERN

The Type B person in contrast, is marked by an absence of the Type A characteristics (Jenkins,

Rosenman and Zyzanski, 1974.), but is far more aware of his capabilities than concerned with what peers and superiors may think, has accepted his virtues and deficiencies and while he may strive for things worth having, will also attempt to become some of those things worth being (Friedman and Rosenman, 1974.). In other words, the Type B person 'will take time to enjoy life'.

Today there is a considerable volume of literature to support this hypothesis. Many studies have been carried out in many different countries including New Zealand (Spicer, 1977; 1978a; 1978b.). Yet perhaps our more relaxed way of life in view of the statistics on CHD in this country is like Barry Crump's myth of bygone days ... of a raw pioneer rural society. In reality, we have an increasingly mature urban society and most New Zealanders are suburbanites with the associated pressures of a fully developed country (Department of Statistics, 1977; McGee, 1969.).

The significant association of the Type A behaviour pattern with increased prevalence of CHD has now been confirmed in the literature. The WCGS study was initiated in 1960 as a prospective epidemiological investigation of CHD incidence in 3,524 men aged 39-59 years at intake employed in the San Francisco Bay area and Burbank and has been the

subject of a number of publications (Barron and Rosenman, 1968; Rosenman et al, 1964; 1966a; 1966b; 1970; 1975; Jenkins, 1974.). Furthermore, in a study of 51 autopsy subjects previously enrolled in the WCGS, it was found that those who while living had exhibited the Type A Behaviour Pattern succumbed to CHD six times more frequently than subjects who exhibited the converse (Type B) behaviour pattern (Friedland et al, 1968.).

Other investigators have also presented data with similar findings. Keith, Lown and Stare (1965) utilised blind interviewing and rating procedures in a study of patients with CHD and other chronic diseases and concluded, 'The independent studies of the Type A Behaviour Pattern are greater in number and in consistency of positive findings than any other studies of the major categories of psychosocial variables' (p 1037).

Caffrey also found Type A behaviour to be highly associated with CHD prevalence in American Monks (1968; 1969.). More recently, Jenkins (1976b) in his review of the literature in this area noted that this pattern (which can now be reliably rated as a deeply ingrained enduring trait (Mathews, 1977; Rosenman, 1966; Waldron et al, 1977)) was related to CHD in all but one of his 22 studies reviewed.

III. OTHER PERSONALITY FACTORS

An alternative approach to CHD aetiology is to suggest that personality related factors are causal, and of significance here is the considerable incidence of both anxiety and depression in cardiac patients (Mackay, 1974). However, there is still controversy about the extent to which anxiety and depression may be causal in CHD or merely follow its onset (Thiel et al, 1973.). Nonetheless there is much evidence in the literature for the presence of both anxiety and depression as occuring long before the onset of the actual clinical manifestation of coronary disease.

(I) Anxiety

Ostfeld et al (1964) showed that individuals that develop CHD score, before the onset of CHD, higher on some anxiety sub scales than individuals who remain healthy; and furthermore, these anxiety components appear to correlate significantly with biological and clinical parameters of risk (Segers and Mertens, 1977a.). Baker and Levenson (1967) also found anxiety preceded the symptoms of CHD, and while Segers and Mertens (1977b) found it accompanied the clinical manifestation, they also suggest it is predispositional and may even play a motivational role in the seeking of medical help.

However Jenkins (1971a) cautions in the limitations of retrospective studies and points out that anxiety may well be a reaction to the coronary event rather than a precursor of it. In Thiel et al's (1972) work they note:

> 'Patients emphasised clearly they had been anxious (with or without depression) for at least one to two years prior to their first MI. Moreover, the higher incidence of divorce, the long period of heavy smoking, the excessive fluid intake[2], the years of extreme overwork, the hyperactive behaviour pattern, the chronic insomnia, and the recurrent feelings of nervousness indicate long-standing elements of anxiety.'
>
> (p54, brackets inserted)

Jenkins (1976a) in a later publication admits that despite notable exceptions the general thrust of the findings is that of a definite association of anxiety with CHD than that for healthy control subjects. He adds, excessive use of denial and repression as a defensive mechanism has also been widely reported.

Friedman et al (1974) also found anxiety predictive of MI. In the Kaiser-Permanente study in Oakland and San Francisco when subjects responded to

---

2 With this sort of picture, although not specified in this case the general literature indicates that this would be of an alcoholic nature.

a 155 item true false questionaire similar to the MMPI, persons in whom MI later developed had at a statistically significant level scored higher on anxiety items than matched persons remaining free of infarction.

(II) Depression

There is also strong supportive data for the depression hypothesis. Various studies have shown the reported incidence of depression in the pre-infarct period or as a correlate of the condition when overt.

Thomas et al (1975) reported that in the period prior to CHD for six of their ten subjects the major impression was one of depression. Thiel et al (1972) found in his studies 20% of his infarction patients showed high scores on depression. Wynn (1967) assessed depression as sufficiently severe to have contributed significantly to disability in 40% of his sample, while in India in 1971, Sengupta and Sengupta reported 21 of their 80 cases of MI as suffering from depression. Ruskin et al (1970) even more significantly found that 83% of their sample of 128 MI patients scored at least one standard deviation (SD) above the mean in depression than that of the normal subjects.

IV. PSYCHOSOCIAL FACTORS

Jenkins in two separate part publications provides

the most comprehensive review of the evidence in the literature on the psychological and social risk factors for CHD with over 250 references cited, a number of which in their own right were reviews. (1971a; 1971b; 1976a; 1976b.). He notes studies relating psychosocial variables to CHD have been fraught with contradictions. Many of the studies have both positive and negative results, and in earlier work contained many weaknesses in design, measurement, and in the inferences drawn, although more recently an increasing number of papers have been well designed, applying more reliable procedures for categorization and measurement with larger samples of subjects, which, amongst the many divergencies, show at least some consistencies. These psychosocial variables are measureable and the validity of the relation between certain psychological and psychosocial risk factors and coronary disease has been confirmed in both prospective and retrospective studies in a variety of different populations and by a great many research teams (1976b).

To begin with, social status indices (income, occupation, education, religion, marital status) considered singly do not appear to have a regular relationship with CHD, although it would appear that early in the process of urbanization and industrialization the upper socio-economic classes are at elevated risk

whereas toward the end of the process the lower socio-economic classes have a higher risk (Holme et al, 1976) and urban workers tend to have a higher ratio than rural workers (Syme et al, 1964).

Lehman (1967) reviews the medical literature on social class and CHD and in every study reviewed he found some relationship between class and heart disease although the strength of this relationship varied. Antonovsky (1968) considered 35 mortality and 21 morbidity studies from the United States and Great Britain and found most studies showed large differences in social class but that there was no consistent gradient in this.

Secondly, in social mobility and status incongruity, (the latter meaning where different characteristics of a person simultaneously place him at different levels of the social hierarchy) research evidence is again somewhat mixed for this possible relationship to CHD although both supporting and detracting evidence has emerged. Perhaps the best that can be said is that these may be valid predictors only in certain places or in certain eras, or perhaps, when other variables are included.

Thirdly, life problems and dissatisfactions have repeatedly been found to be more prevalent in patients

with CHD although most of these studies have depended on retrospective data (Jenkins, 1976b). In Liljefors and Rahe's (1970) identical twin study in Sweden on these psychosocial variables and CHD the subjects consistently demonstrated the hypothesised relationship with the life dissatisfaction category providing the highest significant correlation.

Fourthly, stress seems to be regarded as a significant factor and various studies have shown that risk and MI increases with the amount of stress faced by the individual and the extent to which he is frustrated by his environment. Bruhn et al (1968) describes this as:

> 'long term involvement of the individuals mental processes in his attempt to live with, or cope with, some life fact or conflict which involves some deeply ingrained aspect of the individual such as his values, beliefs, self concept or interpersonal relationship... thus life long conflicts that are perceived to be insolvable to an individual whose mental resources are continually mobilised as if he were attempting to solve them may eventually leave him in a state of mental and physical exhaustion' (p37)

Thus the concept of stress must be broadened to include diffuse states of increased arousal, lasting perhaps, for years (Johns, 1974).

French and Caplan (1970) include job responsibility and the need for social approval as measures of stress, which they found were significantly correlated with physiological risk factors. Wolf (1969) describes the physiological and chemical changes associated with an emotionally stressful environment that may lead to CHD, while for Theorell (1974) life events are important causes of stress. Life changes reported to have occurred prior to episodes of MI have also been documented by Theorell and Rahe, (1971) and by Rahe and Paasikiui (1971).

Because of inconsistencies in the data one cannot be too definite about the causal nature of stress, only that there is a statistical association between psychosocial stress and CHD (Jones, 1973).

V. PHYSIOLOGICAL STUDIES

Jenkins (1976b) concludes in his exhaustive review of the psychosocial factors in CHD, that the simultaneous study of psychosocial and the standard risk factors should become in future the approved design both for behaviourally oriented and for traditional epidemiologic studies of coronary disease and atherosclerosis (p1037).

This premise is given support and it is for this reason that the standard physiological risk factor indices of cigarette smoking and exercise have been included.

Alcohol consumption as a more recent possibility, taking cognizance of New Zealand's high consumption rate was also included as a possible interesting variable.

Studies in these areas showing a correlation to CHD have been cited in the introduction and it is not therefore intended to extensively review the physiological data.

VI. THE NEW ZEALAND STUDIES

Despite the high morbidity and mortality experience attributable to CHD in New Zealand (Department of Health, 1975; Department of Statistics, 1977; Foster and Hay, 1976.) little attention appears to have been placed on the psychological risk factors associated with CHD in New Zealand.

In 1959 Emery submitted a thesis for an MD on 'Ischemic Heart Disease in an Urban New Zealand Community'. This covered Emery's work in his general practice in Dunedin and was based on the 171 people he interviewed and treated. This comprehensive work was divided into two sections. Firstly, a section on the extent, nature and occurrence of ischemic heart disease as observed in the population at risk - the patients of a group of general practitioners in Dunedin, and secondly, a section on a comparative study of the group of people with

ischemic heart disease. It is this second section which is relevant to this thesis as he studied a number of personality, psychological and psychosocial factors.

In summary he found a basic personality of high intelligence and an unstable emotional reaction which was linked with a high degree of inner tension and the need for special modes of adjustment. A large number of his sample appeared to be the ambitious and successful type of individual of above average intelligence. Others in his sample were people of again above average intelligence but lacking in ambition.

As far as stress was concerned he classified people by their ways of reacting to stress in terms of tension, nervousness and emotional instability throughout life. He found that 75 were more nervous than average, 133 were more tense than average, and 126 were considered to be emotionally unstable, although the females tended to be somewhat more labile emotionally than the males. It is a pity that Emery did not match these subjects with a group of controls. He also considered the area of conscience, psycho-sexual adjustment and sociability but in these areas his data did not allow any firm conclusions to be drawn.

Two of the physiological measures he included

were cigarette smoking and alcohol consumption. The results in the first measure were rather interesting. Of the males of the group only eight had never smoked, the remainder being classed as relatively heavy smokers, but the greatest proportion of females had never smoked and of those that did they were relatively light smokers. Overall alcohol consumption was considerably in excess of that prevailing in the community, particularly for males.

The next study appears to be Mackay's (1974) M.Sc. thesis on 'Factors affecting the initial rehabilitation of thirty male patients admitted to the coronary care unit of Princess Margaret Hospital in Christchurch with their first confirmed MI'.

She considered the variations in anxiety, depression and resistance to the medical regimen (measured as co-operation) that might result from age, socio-economic background and degree of understanding of the illness variances. While a number of her patients were classified as 'anxious' her findings may have been contaminated by the fact that a number were on Valium (Diazepam) which may have masked their feelings of anxiety. Only one was classified as depressed. She found the level of cooperation and understanding of the illness greater in the higher socio-economic classes.

This study was also marred by the lack of matched controls.

A much better methodologically designed study has been recently completed by Bianci et al (1977; 1978.), Bianci and his co-workers investigated the mental state and other psychosocial precursors of MI using 40 patients admitted to the Cardiac unit of Princess Margaret Hospital with a first attack of MI as diagnosed by electrocardiograph and blood enzyme tests. They compared these patients with matched controls admitted to hospitals in the Christchurch region for minor routine surgery.

They examined the extent to which various exogenous stress factors, personality characteristics and mental state variables were related to the risk of MI and concluded from their results that anxiety and depression appeared to be characteristic of the pre infarct period and that these can therefore be considered as predictors of CHD. Interestingly they did not find a strong correlation on measures of personality (Type A Behaviour Pattern) as an important variable, a somewhat surprising result in view of the large body of literature which has identified this as at least being predispositional. Stressful life events occured two and a half more times in the heart attack patients in the preceding 18 months as compared to the controls. Cigarette smoking

and family history showed a significant correlation but alcohol consumption was not discriminatory for the two groups.

Spittle and James (1977) also studied psychosocial factors and MI on 61 male patients who had survived a first MI with a group controlled for age and social status resident in Dunedin. Two questionnaires totalling 370 questions were used. These included the Edwards Personal Preference Schedule, providing a measure of 15 personality variables, the Bendig Anxiety and Welsh Depression sub scales of the MMPI, the Cochrane and Robertson Life Events Inventory, and as well, originally designed questions based on known risk factors.

Significant differences were found in several dimensions of personality as well as in the family histories of MI and in certain aspects of life style. The patient group showed a greater positive family history, sense of independence, difficulty in relaxing, and a sense of personal inferiority than the controls. These authors note that evidence is now sufficiently strong to take seriously the proposition that certain life styles and emotional response patterns constitute one of the contributing factors leading to early MI, and the major importance of this, is that unlike one's

genetic inheritance these factors may be amenable to modification by recommendation of changes in one's personal and psychological way of life.

Finally there is the extensive work of John Spicer and his associates at the Auckland Medical School, supported by the National Heart Foundation of New Zealand. Their work includes papers on 'Psychological Correlates of Physiological Risk Factors in CHD; Report to the National Heart Foundation of New Zealand' (1977b), 'Psychological Risk Factors Associated with CHD; Their Prevalence and Physiological Correlates in a New Zealand Sample' (1978a), and 'The Type A Behaviour Pattern in New Zealand' (1978b).

The general aim of these studies was to estimate the prevalence of and the interelationship of a number of psychological, psychosocial and physiological variables as possible risk factors of CHD both singly and in combination and to estimate their prevalence in New Zealand from the sample of 524.

The psychosocial variables in the study included a measure of the Type A Behaviour Pattern as assessed by the Standard Situation Interview (SSI), the Jenkins Activity Survey (JAS) and by the Vickers Rating Scale. A measure of perceived work load by a Subjective Quantitive Workload Index; recent life changes with a

modified version of the Schedule of Recent Experience developed at the Institute of Social Research (ISR) at the University of Michigan; anxiety measured by the Bendig sub scale of the MMPI, depression measured by the Welsh sub scale of the MMPI and psychosocial supports measured by the Luborsky Social Assets Scale.

At the end of the psychological assessment blood pressure was taken along with a resting 12 lead electrocardiograph and blood samples for measures of serum cholesterol, triglycerides, uric acid and glucose. Cigarette smoking and history and alcohol consumption were also recorded.

While these investigations are the subject of papers presently in preparation for publication some general results have emerged to date. Firstly the prevalence pattern for both sets of variables (psychological and physiological) appear to be similar to those reported from other western countries although differences in the structure of Type A (overt) behaviour patterns have emerged allowing speculation as to its degree within New Zealand as compared with the United States. A multiple regression analysis showed a highly significant relationship between Type A behaviour and triglycerides[3] and between anxiety and

and glucose levels. Workload in combination with Type A behaviour appeared to be related to blood pressure while the results concerning depression, stress and of psychosocial supports may be suggestive of an association. 47% of the sample were smokers, while the median intake of alcohol was 115 grams per week.

Much of this investigative work is still in progress and aspects of these worker's material that are replicated in this present investigation will be elaborated on in further detail in the next chapter.

---

3 Type A behaviour and fasting triglycerides were inversely related. That is, Type As had significantly lower triglyceride levels. This is a reversal of the findings of the WCGS studies and one for which there is no apparent explanation.

CHAPTER III

MATERIALS AND METHODS

In order to test the hypothesis proposed in Chapter I some form of structured questionaire was required. It was first necessary to develop a test to divide the subjects into Type A Behaviour Pattern (or alternatively Type B Behaviour Pattern) then to develop tests for the specific psychological measures of anxiety and depression, and finally to construct questions to measure possible psychosocial aspects and selected physiological relationships.

I. THE DEVELOPMENT OF THE QUESTIONNAIRE

(I) Type A/B Behaviour Pattern

Of the various measuring instruments which have been developed the SSI is considered to be the most sensitive and reliable method for classifying behaviour as Type A or B (Bortner and Rosenman, 1967; Friedman, 1969; Rosenman, 1964.). In this highly structured 15 minute interview which is usually tape recorded, the subject is questioned about his competitiveness, aggressiveness, reaction to deadlines, job involvement and so on. The interviewer gathers information from three sources; the content of the subject's replies, his

gross motor behaviour, and his speech and conversational characteristics. On the basis of these the interviewer classifies the subject as:-

A1 Fully developed Type A
A2 Incompletely developed Type A
B3 Incompletely developed Type B
B4 Fully developed Type B
X5 Of a mixed Type

Another alternative measure is the JAS which is a multiple choice questionaire (Jenkins, 1967) and the best validated self report measure (Jenkins et al, 1967; 1968; 1974.) for the behaviour pattern.

Factor analysis has also provided interesting insight of a similar nature for both tests on the structure of the coronary prone behaviour pattern (Mathews et al, 1977; Waldron et al, 1977.). Unfortunately to use either the SSI or the JAS one has to receive specialised training in either the United States or Europe which was problematic as they certainly are the most sensitive measures available. (Spicer, 1978c).

Consequently it was decided to consider more easily accessible measures. There were two available. The short form of the Vickers rating scale (Vickers, 1973) which has been validated against the JAS, and the Bortner rating scale (Bortner, 1967), this latter

having gained wide acceptance and the support of the World Health Organization (Spicer, 1978c).

As there did not appear to be any other study in the literature that had utilised these two scales purported to measure the same behaviour it would seem to be a valid contribution to discover the relationship between the two scales. For this reason it was decided to utilise both.

(a) Vickers Rating Scale. This is a short form of a larger set of scales developed by Sales and Caplan (Sales, 1969; Caplan, 1971; cited by Vickers, 1973.). The development of this measure began in a doctoral dissertation 'Differences among Individuals in Affective, Behavioural, Biochemical and Physiological Responses to Variations in Workload' (Sales, 1969) with a large set of items designed to tap various aspects of the Type A Behaviour syndrome with 72 items forming 14 distinct clusters. The next step using this index was Caplan's doctoral thesis 'Organizational Stress and Individual Strain; A Social Psychological Study of Risk Factors in CHD Among Administrators, Engineers and Scientists'. (Caplan, 1971). In this case only nine variables which Sales found to be the most effective were employed but even this involved 49 items. Vickers (1973) employed a three step process from this using factor

analysis to derive a subset of nine items presented to the respondent with a seven point response scale ranging from 'Very true of me' to 'Not at all true of me'. This scale has since been used in New Zealand by Spicer (1977b; 1978a; 1978b.).

(b) Bortner Rating Scale. This is a short rating scale consisting of 14 bi polar descriptions of Type A and B Behaviour, each pair joined by a line one and a half inches long. The subject is asked to mark where he lies on this line between the two extremes in each case. This scale has also been validated against the SSI (Bortner, 1969). It was derived from earlier multiple choice question items (Bortner and Rosenman, 1967; 1969.).

(II) The Anxiety and Depression Scales

The literature that has implicated both anxiety and depression in the development of CHD seemed to justify the inclusion of these measures as possible correlates of Type A and B behaviour patterns.

The 25 questions are modifications of the Bendig Anxiety and the Welsh Depression sub scales of the MMPI with each subject asked to indicate his answer as either yes or no and from these responses the scores are derived. These scales have been found valid predictors of anxiety and depression by Rodda et al, (1971) Thiel et al, (1973) Spittle and Adams, (1977) and they were also used in Spicer's work (1977b, 1978a, 1978b.).

(III) Other Psychosocial Variables

A number of other psychosocial variables were included in the questionnaire.

Questions on marital status, education, occupation, social assets, social group membership and friendship were all derived from Luborsky et al's (1973) scale of social assets for predicting physical and psychological illness and health but slightly modified for New Zealand conditions. They suggest the more one has of what is valued in society the easier it should be to adapt to its demands and challenges. Despite the fact that social assets based on education, occupation and marital status may be the present day version of being 'healthy, wealthy and wise' they have been found to be prognostic of some causes of illness (p115).

The recent events (stress) measure was a substantial modification of the Schedule of Recent Experience developed at the Institute of Social Research at the University of Michigan and used by Spicer (1978c). This was included to provide some measure of the impact of such events on life. The question was modified to include one summarising question from each of the sections. A question on family history was also included.

(IV) The Physiological Variables

The questions on smoking and drinking habits were derived from Karunaratne and Hight's work in Taumarunui (1977; Hight, 1978.).

The question on exercise was derived from the National Heart Foundation of New Zealand's progress report (1976) as defined by Morris et al (1973).

II. THE SAMPLE

The sample chosen for the surveys were the residents of Rolleston, a commuter suburb situated 14 miles south of Christchurch.[4] Survey respondents were all Rolleston residents registered on the 1975 Rakaia Electoral District Main Roll. This totalled 479 in all.

---

4 Rolleston is a small community of approximately 1000 people situated 14 miles south of Christchurch. It is a recently established area, housing mainly young married couples, many of whom commute to Christchurch for work. It has a primary school, a few shops, a railway station, (in fact is the junction point for the West Coast) a hotel, and two garages. It is surrounded by land generally of limited agricultural value. (New Zealand Broadcasting Corporation, 1975). It is in close proximity to Weedons Communications Air Force Base, Rolleston Prison, Burnham Military Camp and Lincoln Agricultural College, and therefore can be presumed to contain an over-representation of airman, prison warders, soldiers and students as compared to other areas of New Zealand.

III. PROCEDURE

Data collection for this research was carried out by utilising the mailed survey technique (Rose and Blackburn, 1968).

However, one of the major problems associated with mailed surveys is the difficulty of obtaining an adequate response rate (Scott, 1961). Another problem in the construction of the questionnaire was to ensure it was sufficiently simple and straightforward to be understood by the majority of the population to be surveyed. Also, by using this technique there would be no opportunity to supplement the respondent's answers by clarification.

On the other hand, an advantage of using this technique was that some questions required a 'considered' rather than an immediate answer, whilst others of a more personal nature (aspects of the scales) were more likely to elicit honest answers, than if the respondents had been face to face with an interviewer. (for example alcohol consumption) This method also avoided the problem of 'interviewer bias' a potential methodological problem in any study (Rosenthall, 1966).

The questionaire itself was designed in two

parts. Part one consisted of the overall general questions and part two was made up of the four rating scales. Identification of each scale was by the originator's name only with no indication of what the scale was actually measuring. It consisted of eight pages altogether. The questionnaire was then pilot tested on 12 army officers from Burnham Military Camp to detect faults in the test construction and meaning; minor adjustments were made to the wording on the results of this. (see appendix I).

It was felt that the subject of CHD was sufficiently interesting and promulgated by the news media to gain the respondent's interest. A covering letter of explanation was enclosed (see appendix I) along with a self addressed franked envelope, a fact noted by Moser and Kalton (1972) to increase response rates. Complete anonymity was assurred[5]. The survey was then posted to the 479 persons listed as living in Rolleston by the 1975 Rakaia electoral district main roll.

---

5 This was not strictly accurate. Because a follow up was intended it was necessary initially to be able to identify the respondents. This was done by a serial number on the questionaire correlated with the persons name on the electoral roll. Consequently the follow up letter had to be worded as though all the sample received one - not just the non respondents. Once the follow up letter and telephone call or visit was completed all serial numbers were discarded. The original assurance of complete anonymity was a mistake not originally recognised.

Non respondents were sent out a follow up letter (see appendix II) ten days later, and seven days following this the remaining non respondents were where possible contacted by telephone or personal visit. Table I overleaf shows how the original sample number was progressively reduced to provide the final study sample.

Of the 479 residents sent the survey 131 could not be traced. This was much higher than expected. One explanation may be that a higher than normal number of respondents were residents from a fairly mobile population. Weedons Air Force Base and Burnham Military Camp residents are subject to the Armed Forces policy of two year postings and Lincoln Agricultural College residents would be likely to move upon completion of study. This is clearly one reason for exercising caution in generalizing the results to the rest of the population of New Zealand.

Some subjects responses were considered unsuitable because of an apparently poor command of English or inadequate comprehension of instructions to enable completion of the form. The final study sample consisted of 260.

Table one — The derivation of the study sample from persons registered at Rolleston from the 1975 Rakaia Electoral Roll.

479	Original sample
131	Untraceable (27%)
348	Remaining sample (72%)
178	First return (of 260 68%)
64	Second return - after first follow up. (of 260 24%)
22	Third return - after second follow up. (of 260 8%)
4	Deemed unsuitable (1.5%)
260	Total responses (of 348 74%)
260	Final Study Sample

CHAPTER IV

RESULTS AND ANALYSIS

The data described in the following section was obtained from the final study sample of 260, of which 135 (52%) were females and 125 (48%) were males. Of the 479 persons to whom the questionaire was originally sent, 178 replies were initially received and from the follow up letter a further 64 replied. The third return after where possible a telephone call or visit, gained another 22 replies. 131 residents could not be traced possibly due to the highly mobile nature of the population. Four responses were not included as they were considered to be inadequately completed.

Each subject completed the psychosocial and physiological data and the four measures of psychological assessment as shown in table two overleaf.

I. SCORING

Psychosocial measurements were obtained for age, marital status, position in family and family history. Scoring for the modification of the Luborsky scale and the Schedule of Recent Events modification for stress were also developed. The physiological

Table two Psychosocial, Physiological and Psychological Variables used in the study.

Variable	Source
Psychosocial	
Age	General
Sex	
Marital Status	
Family History	
Position in Family	
Education	Luborsky's
Occupation	Social Assets
Economic Status	Scale (1973)
Assets	
Social Group Membership	
Recent Events	Modification of The Schedule of Recent Events
Physiological	
Exercise	NHFNZ*
Cigarette Smoking	Karunaratne
Alcohol Consumption	and Hight (1977)
Psychological	
Type A/B Behaviour Pattern	
Vickers Rating Scale	Vickers (1973)
Bortner Rating Scale	Bortner (1969)
Anxiety	Bendig (MMPI)
Depression	Welsh (MMPI)

*National Heart Foundation of New Zealand.

variables for exercise, smoking and alcohol were also measured.

For the behaviour pattern, each respondent questionnaire was scored to yield on the Vickers and Bortner scales a rating of behaviour classified as:

AI Fully Developed Type A
A2 Incompletely developed Type A
B3 Incompletely developed Type B
B4 Fully developed Type B

The psychological measures, the Bendig anxiety and Welsh depression sub scales of the MMPI were each scored for positive answers.

The scoring technique utilised for each of these variables is shown in appendix III.

II. THE RAW DATA

The raw data obtained for each subject is available in appendix IV. Of the respondents, 101 (38%) on both the Vickers and Bortner scales were classified into the Type A or Type B behaviour pattern as A1, A2, B3 and B4, whilst 143 (55%) were classified as either Type A or B on both the scales. These results are reproduced in table three and shown graphically in figures one and two.

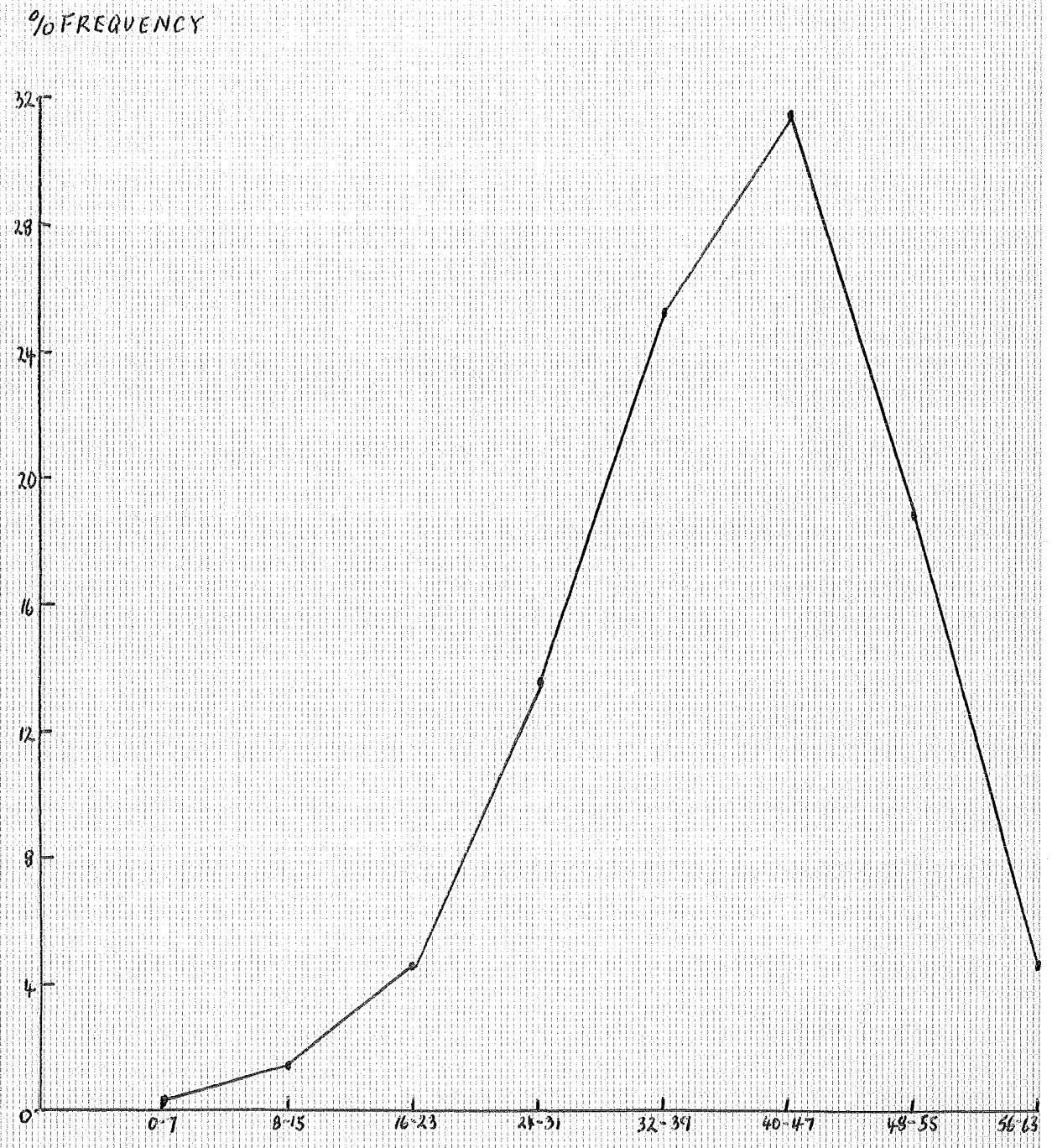


FIGURE ONE 'DISTRIBUTION OF VICKERS RATING SCALE SCORES'

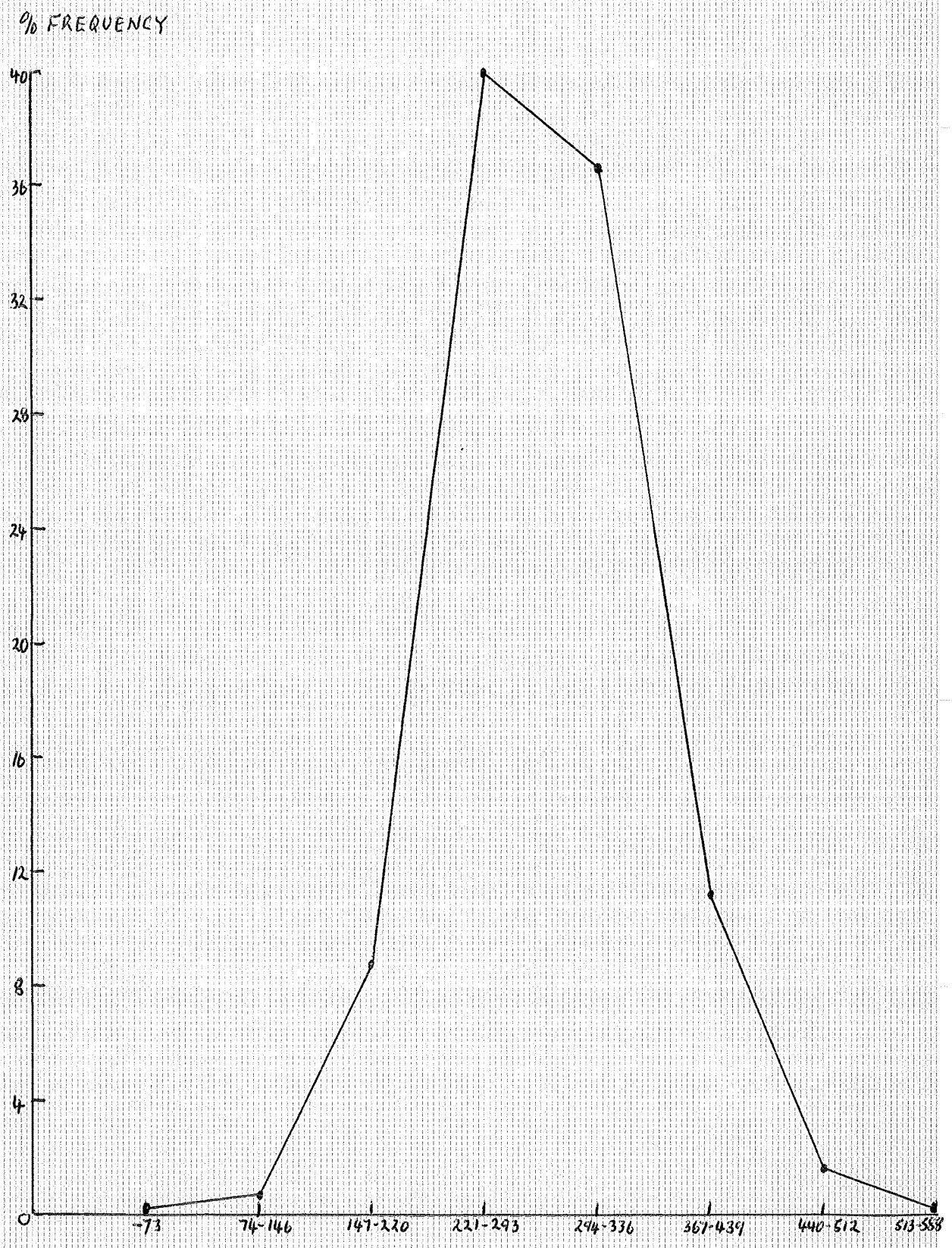


FIGURE TWO 'DISTRIBUTION OF BORTNER RATING SCALE SCORES'

Table three Breakdown of Types A and B Behaviour Pattern on the Vickers and Bortner Scale

Type	No of Cases	Vickers	Totals	Bortner	Totals
A1	75	71		4	
A2	259	136	207	123	127
B3	181	49		132	
B4	5	4	53	1	133

* Each individual has one score on each scale

Means, standard deviation and the ranges are shown in table four.

Table four Means, standard Deviations and Ranges on the Vickers and Bortner Scale

	Mean	SD	Range
Vickers	39	10.29	52
Bortner	297	63.49	393

III. THE CORRELATION

A Pearson Product Moment correlation was performed

between the Vickers and Bortner self rating scales. The coefficient was 0.332. This was significant at beyond the p.01 level. ($df^1 = 259$). This relationship following Heath and Downie's (1965) suggestion is shown graphically in the scattergram overleaf. (Figure three) Although the two scales correlated significantly, the small size of the coefficient was such as to deem the relationship as psychologically insignificant.

Consequently a decision on which scale to choose for further analysis had to be made. The Bortner scale was chosen for the following reasons. Examination of both scales for face validity showed on the Vickers scale all the Type A behaviours at one end. As already noted, Type A behaviour is regarded as a socially desirable behaviour and therefore a fairly obvious choice to an astute respondent and even while attempting to be honest would have tended to emphasise this end of the scale. On the other hand the Bortner scale had the Type A and B behaviour ends randomised, and furthermore, the behaviours were worded in such a way that the respondents would have had more difficulty in deciding which behaviours were in fact the more desirable ones thereby answering the questions more reliably.

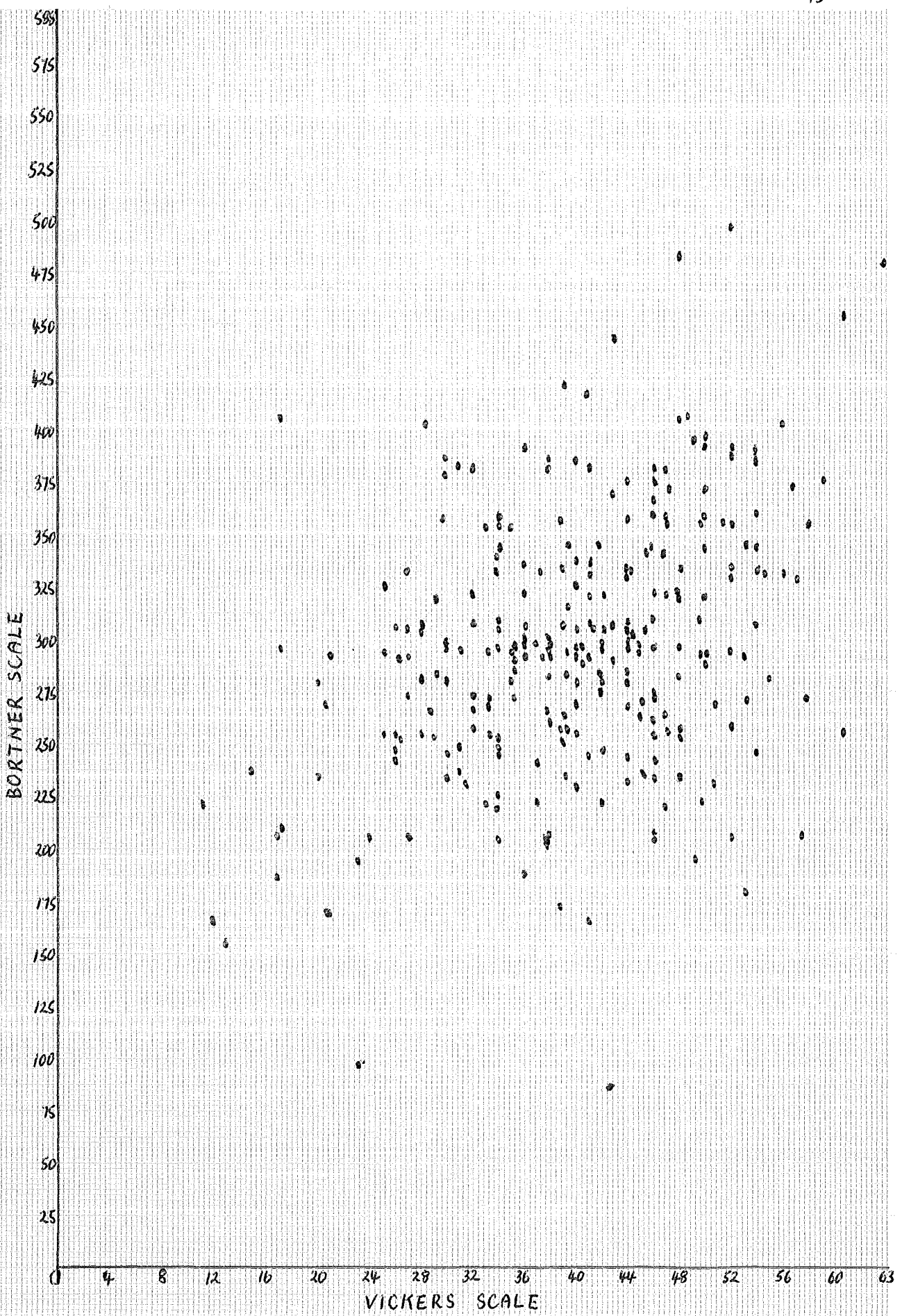


FIGURE THREE. 'SCATTERGRAM SHOWING THE RELATIONSHIP BETWEEN THE VICKERS AND BORTNER SCALES'

IV. THE ANALYSES PERFORMED

For the statistical analysis the categories of the Type A and B behaviours, that is; A1, A2, B3 and B4 were collapsed as the two extreme measures - A1 and B4 - had insufficient cases for statistical computations to be meaningful. This meant that comparisons were made between two groups, namely, Types A and B. The significance of difference between these two groups on anxiety, depression, age and social assets were determined by means of t tests. Further post hoc t tests were later carried out for sex differences on A and B, and on the anxiety and depression scores. The Chi square test was used for the analysis of marital status, family history, position in family, smoking, exercise, stress and alcohol. Siegel's (1956) and Winer's (1962) computational procedure was followed.

(I) Analyses Detail

The following outlines the t tests and Chi square analyses to determine any significant differences on each of the variables. Raw data for the t tests and Chi square tests are enclosed as appendices five, six and seven.

(a) Analysis one. The aim of this analysis

was to determine whether any significant differences between Type A and B subjects occurred in the anxiety scores. A significant difference was found between the Type A and Type B behaviour pattern ($t = 6.62$, $df = 258$, $p<.001$) indicating that Type As (mean = 3.72) showed a higher level of anxiety than the Type Bs (mean = 1.77).

(b) Analysis Two. The aim of this analysis was to determine whether or not there was a significant difference between Type A and B depression scores. A significant difference was found between the Type A and Type B behaviour pattern ($t = 2.09$, $df = 258$, $p<.05$) indicating that Type As (mean = 2.31) showed a higher level of depression than the Type Bs (mean = 1.68).

(c) Analysis Three. The aim of this analysis was to determine any significant difference in age between the two behaviour patterns. A significant difference was found between the Type A and Type B behaviour pattern ($t = 2.09$, $df = 258$, $p<.05$) indicating that the Type As (mean = 36.22) were younger than Type Bs (mean = 39.77).

(d) Analysis Four. The aim of this analysis was to determine any significant difference in assets

and the two behaviour patterns. The results of this were not significant ($t = 0.50$, $df = 258$) between the Type As (mean = 17.51) and Type Bs (mean = 17.26) indicating that assets was not an important variable.

(e) Analysis Five. The t test for two independent samples was carried out to determine whether or not the two sexes differed on the Bortner scores, and on the anxiety and depression scores. The sex difference was significant on the Bortner scale (female mean = 290, male mean = 302, $t = 5.13$, $df = 258$, $p<.001$). This indicates there was a difference in the two sexes with males scoring higher. Anxiety (female mean = 3, male mean = 3, $t = 1.07$, $df = 258$) and depression (female mean = 2, male mean = 2, $t = 1.11$, $df = 258$) were not significant suggesting sex was not an important factor.

(f) Analysis Six. Chi square tests were applied to all the nominal data to determine whether there was any significant differences in marital status, family history, the position a person was born in the family, and on smoking, exercise, stress or alcohol in relation to the individuals categorization as Type A or B. These results are summarised in Table five overleaf.

Table Five Chi square Tests for Marital Status, Family History, Position in Family, Smoking, Exercise, Stress and Alcohol.

Factor	X^2	df	Significance
Marital Status	.0	1	NS
Family History	.0	1	NS
Position in Family	5.7	4	NS
Smoking	0.58	2	NS
Exercise	1.56	2	NS
Stress	5.17	6	NS
Alcohol	1.66	3	NS

None of the Chi Square analyses were significant indicating there was no relationship between these factors and the Type A or B behaviour pattern.

CHAPTER FIVE

DISCUSSION

Rosenman et al (1975) found in the WCGS study that approximately 50% of the sample (assessed by the SSI) displayed the Type A behaviour pattern. Jenkins et al (1967) found in his follow up in this using the JAS somewhat similar results. Work from a study of 200 National Aeronautic Space Association employees utilising the Vickers rating scale also suggest an occurrence of the pattern in just over 50% of that sample.[6] Bortner's (1969) work using his scale showed some 62% of his sample as the Type A behaviour.

Spicer (1977a, 1978a, 1978b.) in his Auckland sample using the SSI data assessed on a six point ordinal scale found a prevalence of the Type A behaviour of 34.6% - a finding significantly lower than the United States studies. (he also produced on this data three prevalence estimates assessed globally,(34.6%), by content (46.2%), and by overt behaviour (27.3%).) His JAS and Vickers rating scale prevalence rates were approximately 50% although the latter data indicate his Type A subjects scored very highly. This last

---

6 This original reference was unable to be obtained. Results cited by Spicer (1978a).

result was very interesting as it was replicated in this study.

As a study of table three and figure one will show, a total of 207 (79.61%) of the respondents were classified as Type A (71 = A1, 136 = A2) and only 53 (20.39%) were classified as Type B (49 - B3, 4 = B4) on the Vickers rating scale with the distribution clearly skewed. This seemed to be a somewhat unbalanced classification and one that did not compare with most other findings on prevalence. (Despite the similar skewing to Spicers (1977a, 1978a, 1978b.) work.)

One possible explanation for these high scores was discussed in chapter four; that the Type A behaviours were all at the same end of the scale and represented societys 'socially desirable' behaviours with an obvious contrast at the other end of the scale with the less desirable behaviour. Similarly other respondent biases may have been introduced by the subjects own values or by his view of what the researcher expected (Rosenthall, 1966).

Consequently when the results of these survey responses were compared with the data from other studies and found to differ so much it was decided to discard this measurement from further analyses.

Alternatively the Bortner rating scale results (see table three and figure two) gave a total of 127 (48.85%) of the respondents classified as Type A (4 - A1, 123 = A2) and 133 (51.15%) as Type B (132 = B3, 1 = B4) with a heavy weighting for the two incompletely developed A2 and B3 classifications. This finding was a slightly less than 50% prevalence rate of the Type A behaviour pattern but one that discriminated the respondents much more evenly than the Vickers rating scale with the overall result more in keeping with other studies. Males scored slightly higher than females.

The correlation (see figure three) would seem to suggest therefore that these two scales may not have been measuring the same aspects of the behaviour pattern they were purported to. Alternatively the structure of the Type A behaviour pattern in New Zealand may be different to that of the United States where the two rating scales were developed.

Certainly the premise that this behaviour pattern is prevalent in New Zealand seems supported both in Spicers (1977a, 1978a, 1978b.) work and in this study. However the exact nature of that pattern and its development as a possible CHD risk factor would appear to remain at this stage somewhat speculative. Obviously

extreme caution should be taken in generalising the findings of this study to the general population because this sample showed a preponderance of members of the armed forces and students, both subject in their own right to possible respondent bias, and each has a higher rate of mobility than the general population placing a limitation on any conclusion drawn from this sample.

In the anxiety and depression scores, these were higher in the respondents exhibiting the Type A behaviour syndrome. On the 10 point anxiety scale the mean score for Type As was 3.72 and for the Type Bs was 1.77. On the 15 point depression scale the mean score for Type As was 2.31 and for Type Bs 1.68. This finding is in keeping with other reported studies.

The data on the other variables is complex and not easily summarisable. In age Type As (mean = 36.2) were younger than Type Bs (mean = 39.77). Both groups had an asset mean of 17. 54 respondents were single, and 206 were married. 57 respondents had one member of the family with a positive CHD history and seven had two. Five respondents had suffered a MI themselves. The mode for position in family was the firstborn, and the mean for stress was .5.

Smoking habits showed 127 non smokers, 39 professed to having given up, and 94 smoked with an average of 18 cigarettes per day. One point of interest here is the number of people who indicated they had 'given up' as of the 39 who made this claim only 12 had done so within the last year. In exercise, 17 exercised heavily, 113 moderately and 130 indicated they never did. This rather crude classification is not a valid predictor without calometric or oxegyn consumption values but it does perhaps give some indication of the average persons exercise activity or rather the lack thereof, as exactly half the sample responed as 'never'. Alcohol consumption (again measured very crudely) showed in this sample that 35 never drank, 162 did occasionally, 45 did three times a week, and 18 drank daily. Alcohol content was not assessed.

The fact that the statistical tests were not significant in these variables does not necessarily mean that the effects did not exist in the sample, but only that there was no detectable statistical difference found. It seems likely that whatever risk these variables entail it is their multiplicity that may be significant and the fact that these characteristics appear to correlate with the coronary prone behaviour pattern in at least some studies overseas warrants further investigation.

I. THE BEHAVIOURAL CARDIOVASCULAR RELATIONSHIP

Current thinking holds that the initiating lesion in coronary disease, the atheromatous plaque, develops as a result of mechanical injury to the artery involved; and data has been described earlier (p14) noting the relationship between the chronic excess discharge of catecholamines and hormones and this arterial deterioration.

Rosenman (1974) also suggests a causal relationship from clinical data because the healthy subject exhibiting the fully developed form of the Type A behaviour pattern is usually the individual who exhibits the same biochemical derangements (hypercholesterolemia, hyperlipeamia, hyperinsulinemia and excess discharge of norpinephrine) (p140) so frequently found in patients with CHD and they certainly metabalise triglycerides, cholesterol and phospholipids differently.(Friedman, Rosenman and Byers, 1964).

Anxiety and depression have also been correlated with excess levels of norpinephrine (Williams, 1975) as have stress and recent events with an increase in blood catecholamine levels. (Williams, 1975, Theorell, 1974.).

This suggested behavioural cardiovascular

relationship although based on sound research is still the subject of considerable debate and the basis of this suggested association must remain as speculative only at this stage. However, for this study it does have a corollary, because if correct a change in one's life style could reduce these biochemical levels.

II. IMPLICATIONS FOR THE FUTURE

This study has shown a prevalence of the coronary prone behaviour pattern in the sample investigated. It has also shown a relationship of anxiety and depression to that behaviour and has speculated on a possible patho-physiological relationship.

The need for an effective programme of prevention for CHD in this country is well recognised (National Heart Foundation of New Zealand, 1976). Recommendations relating to the possible physiological risk factors are now well established but those which relate to life styles and emotional responses are less well established.

The implication for this is that if one's life style is one of the coronary prone behaviour pattern and or its psychological or psychosocial correlates it is ammenable to modification. Spittle and James (1977) suggest:-

(1) For the individual

The acquisition of a life style characterised by optimum effectiveness in the absence of unduly intense or prolonged arousal. They note there are indications that such a life style has in any case attractions beyond the prevention of a specific disease and that any re-evaluation that occurs will modify the incessant drive demanded by society. The deliberate incorporation into one's daily life plan of a period of non competitive restful activity and finding an opportunity for solitude, to relax, and view events in a wider and longer term perspective can only be of benefit.

(II) For public health authorities, town planners, the legislature, business and other employing agencies

The provision of information relating to life style and the re-creative use of leisure with the provision of opportunities for recreation, attention to working conditions and the alleviation of unnecessary stress.

They conclude, that while these recommendations may prove difficult to implement, they can only be of value and are unlikely to do any harm.

Much work remains to be done to establish with certainity the existence of the coronary prone behaviour pattern in New Zealand, and more importantly, its mode of operation and its relationship with other known risk factors in CHD. This presents a wide and challenging opportunity for further investigation and research.

CHAPTER SIX

CONCLUSION

In conclusion, the coronary prone behaviour pattern has become established as the best evidenced psychological risk factor associated with CHD overseas. Given the morbidity and mortality attributable to CHD in New Zealand there is obviously a necessity to investigate this risk factor within the New Zealand environment.

From the sample studied, the general hypothesis that there is a prevalence of this behaviour pattern in New Zealand was supported. However, there is a need to exercise caution in generalising these results to the general population of New Zealand because of the highly mobile nature of the sample studied.

In retrospect, it was probably a mistake that the Vickers rating scale data was not included in the complete analyses. There is clearly a need for the development of an objective easily administered test that can reliably discriminate between the type A and B behaviours, and comparative studies utilising the Vickers rating scale and Bortner rating scale as possible measures for this are obvious and offer further opportunities for research.

Anxiety and depression appear to be related to the Type A behaviour pattern, although other explanations to this finding are possible. Other psychosocial and physiological variables remain to be more fully investigated before any conclusive statement could be made. These measures were undoubtedly the weakest in the study particularly since they were the only ones not used and standardized in other work. There is also a need to combine any study of the psychological risk factors with the known physiological ones to further determine any possible inter-relationships.

Perhaps the most important contribution of this study has been to highlight the proposition that certain life styles and emotional response patterns constitute a possible coronary risk factor and to note both for the medical profession and the population at risk, that this pattern unlike one's genetic inheritance is ammenable to modification, and as such this premise could well become a preventive measure for CHD in New Zealand.

REFERENCES

ANTONOVSKY, A. Social class and the major cardiovascular diseases. Journal of Chronic Diseases, 21, 65-106. 1968.

ASHLEY, F., and KANNEL, W. Relation of weight frame to changes in atherogenic traits: The Framington study. Journal of Chronic Diseases, 27, 103-114. 1974.

BAKER, C., and LEVENSON, R. Determinants of angina pectoris. Psychosomatic Medicine, 29, 621-633. 1967.

BARRON, C.I., and ROSENMAN, R. Coronary heart disease: A predictive study involving the aerospace manufacturing industry. Clinical Aviation and Aerospace Medicine, 39, 1109-1115. 1968.

BEAGLEHOLE, R., and PRIOR, I. Prevalence of coronary heart disease in samples of New Zealand maoris and pakehas. New Zealand Medical Journal, 82, 119-122. 1975.

BENGTSSON, C. Ischemic heart disease in woman. Acta Medica Scandinavica, Supplementum 549, 1973.

BERGLUND, G., WILHELMSEN, L., SANNERSTEDT, R., HANSSON, L., ANDERSON, O., SILVERTSSON, R., WEDEL, H., and WIKSTRAND, J. Coronary heart disease after treatment of hypertension. Lancet, 1, 1-5. 1978.

BIANCHI, G., FERGUSSON, B., and WALSHE, J. Mental state and other psychosocial precursors of myocardial infarction. Princess Margaret Hospital, Christchurch. Unpublished paper. 1977.

BIANCHI, G., FERGUSSON, B., and WALSHE, J. Psychiatric antecedents of myocardial infarction. Medical Journal of Australia, 1, 297-301. 1978.

BLACKET, R., LEELARTHAEPIN, B., PALMER, A., and WOODHILL, J. Coronary heart disease in young men: A study of seventy patients with a critical review of etiological factors. Australian and New Zealand Journal of Medicine, 3, 39-62. 1973.

BLOOR, C. Heredity aspects of coronary atherosclerosis. In Likoff, W. Atherosclerosis and coronary heart disease. New York, Grune and Stratton, 1972. p.1-7.

BORTNER, R. A short rating scale as a potential measure of pattern A behaviour. Journal of Chronic Diseases, 22, 87-91. 1969.

BORTNER, R., and ROSENMAN, R. The measurement of pattern A behaviour. Journal of Chronic Diseases, 20, 523-533. 1967.

BRUHN, J., McCRADY, K., and du PLESSIS, A. Evidence of emotional drain preceding death from myocardial infarction. Psychiatry Digest, 29, 34-40. 1968.

BYRNE, D.G., and HENDERSON, A.S. Behavioural Epidemiology and coronary heart disease: Some sources of error and an alternative conceptual model. Australian and New Zealand Journal of Medicine, 6, 425-429. 1976.

CAFFREY, B. Behaviour patterns and personality characteristics related to prevalence rates of coronary heart disease in american monks. Journal of Chronic Diseases, 22, 93-103. 1969.

CAFFREY, B. Reliability and validity of personality and behavioural measures in a study of coronary heart disease. Journal of Chronic Diseases, 21, 191-204. 1968.

CARLSON, L., and BOTTIGER, L. Ischemic heart disease in relation to fasting values of plasma triglycerides and cholesterol. Lancet, 1, 865-868. 1972.

CARLSON, L., EKELUND, L., and OLSSON, A. Frequency of ischaemic exercise ECG changes in symptom free men with various forms of primary hyperlipaemia. Lancet, 2, 1-3. 1975.

CASSEL, J. Summary of major findings of the Evans County cardiovascular studies. Archives of Internal Medicine, 128, 887-889. 1971.

CHAPMAN, J., and Massey, F. The interelationship of serum cholesterol, hypertension, body weight and risk of coronary disease: Results of the first ten years follow up in the Los Angeles

heart study. Journal of Chronic Diseases, 17, 933-949. 1964.

CORDAY, E., and CORDAY, S. Prevention of heart disease by control of risk factors. American Journal of Cardiology, 35, 330-333.

DEPARTMENT OF HEALTH AND SOCIAL SECURITY. (London) Diet and coronary heart disease: Report on health and social subjects. London, Her Majesty's Stationary Office. 1974. p.1.

EDITORIAL. Can I avoid a heart attack? Lancet, 1, 605-607. 1974.

EDITORIAL. Why does coronary heart disease run in families? British Medical Journal, 2, 415-416. 1977.

EMERY, G. Ischemic heart disease in an urban New Zealand community. Dunedin, University of Otago, 1959.p.64-97. (Thesis: M.D.: Medicine)

FLETCHER, G., and CANTWELL, J. Exercise and coronary heart disease. Springfield, Charles Thomas, 1974. p.22-42.

FOSTER, F., and HAY, D. Mortality patterns in acute coronary disease in New Zealand. New Zealand Medical Journal, 83, 39-43. 1976.

FRENCH, J. Evaluation of proposal on psychological risk factors in coronary heart disease. Personal communication to the National Heart Foundation of New Zealand. Ann Arbour, Institute for Social Research. 1974.

FRENCH, J., and CAPLAN, R. Psychosocial factors in coronary heart disease. Industrial Medicine, 39, 383-397. 1970.

FRIEDMAN, G., URY, H., KLATSKY, A., and SIEGELAUB, A. A psychological questionnaire predictive of myocardial infarction: Results from the Kaiser-Permanente epidemiologic study of myocardial infarction. Psychosomatic Medicine, 36, 327-343. 1974.

FRIEDMAN, M. Pathogenesis of coronary artery disease. New York, Mc Graw Hill, 1969. p.1.

FRIEDMAN, M., and ROSENMAN, R. Type A behaviour and your heart. New York, Alfred Knopf, 1974. p. (preface) 52-87.

FRIEDMAN, M., ROSENMAN, R., and BYERS, S. Serum lipids and conjunctival circulation after fat ingestion in men exhibiting type A behaviour pattern. Circulation, 29, 874-886. 1964.

FRIEDMAN, M., ROSENMAN, R., and STRAUS, R. The relationship of behaviour pattern A to the state of coronary vasculature. American Journal of Medicine, 44, 525-587. 1968.

GARCIA, M., McNAMARA, P., GORDON, T., and KANNEL, W. Morbidity and mortality in diabetics in the Framington population: Sixteen year follow up study. Diabetes, 23, 105-111. 1974.

GORDON, T., KANNEL, W., and McGEE, D. Death and coronary attacks in men after giving up cigarette smoking. Lancet, 2, 1345-1348. 1974.

HEATH, R., and DOWNIE, M. Basic Statistical Methods. New York, Harper and Row, 1965. p.87-90.

HELIOVAARA, M., KARIONEN, M., VILHUNEN, R., and PUNSOR, S. Smoking, carbon monoxide and atherosclerotic diseases. British Medical Journal, 1., 268-270. 1978.

HEYDON, S., CASSEL, J., BARTEL, A., TYROLER, H., HAMES, C., and CORNONI, J. Body weight and cigarette smoking as risk factors. Archives of Internal Medicine, 128, 915-919. 1971.

HIGHT, P.L. Taumaranui Hospital, Taumaranui. Personal Communication. 1978.

HOLME, I., HELGELAND, A., HJERMANN, I., LUND-LARSON, P., and LEREN, P. Risk factors and socio-economic status: The Oslo study. Lancet, 2, 1396-1398. 1976.

HOUSE, J. Occupational stress as a precursor to coronary disease. In Gentry, W., and Williams, R. (Eds) Psychological aspects of myocardial infarction and coronary care. St. Louis, C.V. Mosby, 1975. p.24-36.

JENKINS, C. Psychologic and social precursors of coronary disease. New England Journal of Medicine, 284, (Part one) 244-255. 1971a. (Part two) 307-317. 1971b.

JENKINS, C. The coronary prone personality. In Gentry, W., and Williams, R. (Eds) Psychological aspects of myocardial infarction and coronary care. St. Louis, C.V. Mosby, 1975. p.5-23.

JENKINS, C. Recent evidence supporting psychologic and social risk factors for coronary heart disease. New England Journal of Medicine, 294, (Part one) 987-994. 1976a. (Part two) 1033-1038. 1976b.

JENKINS, C., ROSENMAN, R., and FRIEDMAN, M. Development of an objective psychological test for the determination of the coronary prone behaviour pattern in employed men. Journal of Chronic Diseases, 20, 371-379. 1967.

JENKINS, C., ROSENMAN, R., and FRIEDMAN, M. Replicability of rating the coronary prone behaviour pattern. British Journal of Preventive Medicine, 22, 16-22. 1968.

JENKINS, C., ROSENMAN, R., and ZYZANSKI, S. Prediction of clinical coronary heart disease by a test for the coronary prone behaviour pattern. New England Journal of Medicine, 290, 1721-1725. 1974.

JOHNS, M.W. Stress and coronary heart disease. In Wellford, A. T. (Ed) Man under stress. London, Taylor and Francis Ltd. 1974. p.117-124.

JONES, R. The hyperlipoproteinemias: Detection, diagnosis and management. Medical Clinics of North America, 57, 47-61. 1973.

KANNEL, W.B. Coronary risk factors: Recent highlights from the Framington study. Australian and New Zealand Journal of Medicine, 6, 373-386. 1976.

KANNEL, W.B., and DAWBER T.R. Hypotension as an ingredient of a cardiovascular risk profile. British Journal of Hospital Medicine, 11, 508-523. 1974.

KANNEL, W.B., CASTELLI, W.P., GORDON, T., and McNAMARA, P.M. Serum cholesterol, lipoproteins, and the risk of coronary heart disease. Annals of Internal Medicine, 74, 1-11. 1971.

KANNEL, W.B., DAWBER, T.R., KAGAN, A., REVOTSKIE, N., and STOKES, J. Factors of risk in the development of coronary heart disease - six year follow up experience: The Framington study. Annals of Internal Medicine, 55, 33-50. 1961.

KANNEL, W.B., DOYLE, J.T., McNAMARA, P.M., QUICKENTON, P., and GORDON, T. Precursors of sudden coronary death: Factors related to the incidence of sudden death. Circulation, 51, 606-612. 1975.

KARUNARATNE, K., and HIGHT, P.L. Community health screening in Taumarunui. New Zealand Medical Journal, 86, 336-339. 1977.

KESSLER, I. Mortality experience of diabetic patients: A twenty six year follow up study. American Journal of Medicine, 51, 715-724. 1971.

KEYS, A., ARAVANIS, C., BLACKBURN, H., VAN BUCHEM, F.S.P., BUZINA, R., DJORDJEVIC, B.S., FIDANZA, F., KARVONEN, M.J., MENOTTI, A., PUDDI, V., and TAYLOR, H.I. Coronary heart disease: Overweight and obesity as risk factors. Annals of Internal Medicine, 17, 15-27. 1972.

KIETH, R., LOWN, B., and STARE, F. Coronary heart disease and behaviour patterns. Psychosomatic Medicine, 27, 424-434. 1965.

KLATSKY, A., FRIEDMAN, G., and SIEGELAUB, A. Alcohol consumption before myocardial infarction: Results from the Kaiser-Permanente epidemiological study of myocardial infarction. Annals of Internal Medicine, 81, 294-301. 1974.

LEHMAN, E. Social class and coronary heart disease: A sociological assessment of the medical literature. Journal of Chronic Diseases, 20, 381-391. 1967.

LILJEFORS, I., and RAHE, R. An identical twin study of psychosocial factors in coronary heart disease in Sweden. Psychosomatic Medicine, 32, 523-542. 1970.

LUBORSKY, L., TODD, T., and KATCHER, A. A self administered social assets scale for predicting physical and psychological illness and health. Journal of Psychosomatic Research, 17, 109-120. 1973.

MACKAY, J.W. Factors affecting the initial rehabilitation of myocardial infarction patients. Christchurch, University of Canterbury, 1974. p.7-45. (Thesis: M.A.: Psychology)

MANN, J., VESSEY, M., THOROGOOD, M., and DOLL, R. Myocardial infarction in young woman with special reference to oral contraceptive practice. British Medical Journal, 2, 241-245. 1975a.

MANN, J., THOROGOOD, M., WATERS, W., and POWELL, C. Oral contraceptives and myocardial infarction in young woman: A further report. British Medical Journal, 3, 631-632. 1975b.

MATHEWS, J. Alcohol usage as a possible explanation for socio-economic and occupational differentials in mortality from hypertension and coronary heart disease in England and Wales. Australian and New Zealand Journal of Medicine, 6, 393-397. 1976.

MATHEWS, K., GLASS, C., ROSENMAN, R., and BORTNER, R. Competitive drive, pattern A and coronary heart disease: A further analysis of some data from the Western Collaborative Group Study. Journal of Chronic Diseases, 30, 489-498. 1977.

McGEE, T.G. The social ecology of New Zealand cities. In Forster, J. (Ed) Social process in New Zealand. Auckland, Longman Paul, 1969. p.144.

MCLEOD, W.R. Application to the National Heart Foundation of New Zealand for a grant to support research into cardiovascular disease. Auckland.

Auckland School of Medicine, 1974. p.1-6.

MCLEOD, W.R. Application to the National Heart Foundation of New Zealand for an extension to grant 107 to support research into cardiovascular disease. Auckland. Auckland School of Medicine. 1975a. p.1-8.

MCLEOD, W.R. Psychological risk factors in coronary heart disease: A progress report to the National Heart Foundation of New Zealand. Auckland. Auckland School of Medicine. 1975b. p.1-6.

MIETTINEN, M., TURPEINEN, O., KARVONEN, M.J. ELOSUO, R., and PAAVILAINEN, E. Effect of cholesterol lowering diet on mortality from coronary heart disease and other causes. Lancet, 2, 835-838. 1972.

MILLER, N., FORDE, O., THELLE, D., and MJOS, O. The Tromso heart study: High density lipoprotein and coronary heart disease, a prospective case control study. Lancet, 1, 965-967. 1977.

MORRIS, J., CHAVE, S.P., ADAM, C., and SIREY, C. Vigorous exercise in leisure time and the incidence of coronary heart disease. Lancet, 1, 333-339. 1973.

MOSER, C. and KALTON, G. Survey methods in social investigation. (2nd Ed) London. Heinemann Educational Books Ltd, 1971. p.256-262.

MYRHED, M. Alcohol consumption in relation to factors associated with ischemic heart disease: A co-twin control study. Acta Medica Scandinavica, Supplementum 567. 1974.

NATIONAL HEART FOUNDATION OF NEW ZEALAND. Coronary heart disease: A New Zealand Report. Dunedin, John McIndoe, 1971. p.29-40.

NATIONAL HEART FOUNDATION OF NEW ZEALAND. Coronary heart disease: A progress report. Dunedin, John McIndoe, 1976. p.11-98.

NEW ZEALAND BROADCASTING CORPORATION. Transcript of a 'Viewpoint' programme, 30 Mar 1975. p.1-3.

NEW ZEALAND DEPARTMENT OF HEALTH. New Zealand health statistics report: Mortality and demographic data. Wellington, National Health Statistics centre, 1975. p.9.

NEW ZEALAND DEPARTMENT OF HEALTH. Trends, health and health services. Wellington, Health Department, 1975. p.144-147.

NEW ZEALAND DEPARTMENT OF STATISTICS. New Zealand official yearbook. Wellington, Government Printer, 1977. p.98-99.

NOAKES, T. OPIE, L. The cardiovascular risks and benefits of exercise. The Practitioner, 216, 288-296. 1976.

OSCHERWITZ, M., KRASNOFF, S., MORETTI, L., and SYME, L. The relationship of myocardial infarction to parental mortality and longevity. Journal of Chronic Diseases, 21. 341-348. 1968.

OSTFELD, A., LEBOVITS, B., SHEKELLE, R., and PAUL, O. A prospective study of the relationship between personality and coronary heart disease. Journal of Chronic Diseases, 17, 265-276, 1964.

RADFORD, D. and OLIVER, M. Oral contraceptives and myocardial infarction. British Medical Journal, 3, 428-430, 1973.

RAHE, R., and PAASIKIVI, J. Psychosocial factors and myocardial infarction. II. An outpatient study in Sweden. Journal of Psychosomatic Research, 15, 33-39. 1971.

RAKAIA ELECTORAL DISTRICT MAIN ROLL. Wellington, Electronic Data Systems Ltd, 1975. p.1-111.

REGISTRAR GENERALS OFFICE OF NEW ZEALAND. Statistics of the colony of New Zealand. Wellington, John Mackay, 1901. p.39.

REISER, R. Saturated fat in the diet and serum cholesterol concentration: A critical examination of the literature. American Journal of Clinical Nutrition. 26, 524-555. 1973.

RODDA, B. MILLER, M., and BRUHN, J. The prediction of anxiety and depression among coronary patients using a Markov process analysis. Behavioural Science, 16, 482-489. 1971.

ROSE, G., and BLACKBURN, H. Cardiovascular survey methods. Geneva, World Health Organization, 1968. p.64-85.

ROSENMAN, R. The role of behaviour patterns and neurogenic factors in the pathogenesis of coronary heart disease. In Eliot, R. (Ed) Stress and the heart. New York, Futura Publishing Company, 1974. p.123-141.

ROSENMAN, R., and FRIEDMAN, M. Neurogenic factors in pathogenesis of coronary heart disease. Medical Clinics of North America, 58, 269-279. 1974.

ROSENMAN, R., FRIEDMAN, M., STRAUS, R., WURM, M., KOSITCHEK, R., HAHN, W., and WERTHESSEN, N.T. A predictive study of coronary heart disease: The Western Collaborative Group Study. Journal of the American Medical Association, 195, 86-92. 1964.

ROSENMAN, R., FRIEDMAN, M., STRAUS, R., WURM, M., JENKINS, C., and MESSINGER, H. Coronary heart disease in the Western Collaborative Group Study: A follow-up experience of two years. Journal of the American Medical Association, 195, 86-92. 1966a.

ROSENMAN, R., FRIEDMAN, M., JENKINS, C., STRAUS, R., WURM, M., and KOSITCHEK, R. The prediction of immunity to coronary heart disease. Journal of the American Medical Association, 198, 1159-1162. 1966b.

ROSENMAN, R., FRIEDMAN, M., STRAUS, R., JENKINS, C., ZYZANSKI, S., and WURM, M. Coronary heart disease in the Western Collaborative Group Study: A follow-up experience of four and a half years. Journal of Chronic Diseases, 23, 173-190. 1970.

ROSENMAN, R. BRAND, R., JENKINS, C., FRIEDMAN, M., STRAUS, R., and WURM, M. Coronary heart disease in the Western Collaborative Group Study: Final follow-up experience of eight and a half years. Journal of the American Medical Association, 233, 872-877. 1975.

ROSENTHALL, R. Experimenter effect in behavioural research. New York. Appleton Century Crofts, 1966. p.40.

ROYAL SOCIETY OF NEW ZEALAND. Coronary heart disease: Report of a committee of The Royal Society of New Zealand. Wellington, David Jones Ltd., 1971. p.1-48.

RUSKIN, H.D., STIEN, L., SHELSKY, I., BAILEY, M., JEFFERSON, G., BRAVERMAN, E., and ZATZKIN, J. Comparison between patients with coronary heart disease and their spouses together with other demographic data: A preliminary report. Scandinavian Journal of Rehabilitive Medicine, 2, 99-104. 1970.

SCHEIMANN, E. Sex can save your heart and life. London, Bantam Books Inc. 1974. p.51.

SCOTT, C. Research on mail surveys. Journal of the Royal Statistical Society, 24, 143-205. 1961.

SEGERS, M., and MERTENS, C. Personality aspects of coronary heart disease related behaviour. Journal of Psychosomatic Research, 21, 79-85. 1977a.

SEGERS, M., and MERTENS, C. Preventive behaviour and awareness of myocardial infarction: A factorial definition of anxiety. Journal of Psychosomatic Research, 21, 213-223. 1977b.

SENGUPTA, A., and SENGUPTA, M. Psychological reaction after myocardial infarction. Journal of the Indian Medical Association, 58, 241-242. 1972.

SIEGEL, S. Non parametric statistics for the behavioural sciences. New York, Mc Graw Hill, 1956. p.104-110.

SKINNER, B.F. The behaviour of organisms. New York, Appleton Century Crofts, 1938. p.62.

SPICER, J. Application to the National Heart Foundation of New Zealand for a grant to support continuing research into psychosocial risk factors in coronary heart disease. Auckland, Auckland School of Medicine. 1977a. p.1-10.

SPICER, J. Psychological correlates of physiological risk factors in coronary heart disease: Report to the National Heart Foundation of New Zealand. Auckland, Auckland School of Medicine. 1977b. p.1-17.

SPICER, J. Psychological risk factors associated with coronary heart disease: Their prevalence and physiological correlates in a New Zealand sample. Auckland, Auckland School of Medicine, 1978a. p.1-19.

SPICER, J. The type A behaviour pattern in New Zealand. Unpublished Discussion Paper. Auckland, Auckland School of Medicine. 1978b. p.1-15.

SPICER, J. Recent Events. Unpublished Document. Auckland, Auckland School of Medicine. 1978c.

SPICER, J. Personal communication. Auckland, Auckland School of Medicine. 1978d.

SPITTLE, B., and JAMES, B. Psychosocial factors and myocardial infarction. Australian and New Zealand Journal of Psychiatry. 11, 37-43. 1977.

STAMLER, J. Lectures on preventive cardiology. New York, Grune and Stratton, 1967. p.107-162.

STAMLER, J. Risk factors: Their role in the etiology and pathogenesis of the atherosclerotic diseases. In Wissler, R., and Greer, J. (Eds) Pathogenesis in atherosclerosis. Baltimore, Williams and Williams, 1972. p.41-119.

STAMLER, J. Epidemiology of coronary heart disease. Medical Clinics of North America, 57, 5-46. 1973.

STANHOPE, J., PRIOR, I. and MALCOLME, J. Coronary risk factors in New Zealand Maori and European adolescents: The Rotorua lakes study. 2. New Zealand Medical Journal, 82, 336-339. 1975.

STOCKSMEIER, U. Medical and psychological aspects of coronary heart disease. In Stocksmeier, U. (Ed) Psychological approach to the rehabilitation of coronary patients. Heidelberg, Springer-Verlag Berlin, 1976. p.9-19.

SWARTZ, P.L. Personal communication. Dunedin, University of Otago. 1978.

SYME, L. HYMAN, M., and ENTERLINE, P. Some social and cultural factors associated with the occurrence of coronary heart disease. Journal of Chronic Diseases, 17, 277-289. 1964.

THEORELL, T. Life events before and after the onset of a premature myocardial infarction. In Dohrenwend, B.S. and Dohrenwend, B.P. (Eds) Stressful life events: Their nature and effects. New York, John Wiley, 1974. p.101-117.

THEORELL, T., and RAHE, R. Psychosocial factors and myocardial infarction. I. An inpatient study in Sweden. Journal of Psychosomatic Research, 15, 25-31. 1971.

THIEL, H., PARKER, D., and BRUCE, T. Stress factors and the risk of myocardial infarction. Journal of Psychosomatic Research, 17, 43-57. 1973.

THOMAS, C., ROSS, D., and DUSZYNSKI, K. Youthful hypercholesteremia: Its associated characteristics and role in premature myocardial infarction. John Hopkins Medical Journal, 36, 193-208. 1975.

VICKERS, R. A short measure of the type A personality. Unpublished document. Ann Arbour Institute for Social Research. 1973.

WALDRON, I., ZYZANSKI, S., SHEKELLE, R., JENKINS, C., and TANNEBAUM, S. The coronary prone behaviour pattern in employed men and woman. Journal of Human Stress, 1, 2-18, 1977.

WHITAKER, W. Etiology of coronary disease. The Practitioner, 202, 207-215. 1969.

WILHELMSEN, L., TIBBLIN, G., AURELL, M., BJURE, J., EKSTROM-JODAL, B., and GRIMBY, G. Physical activity, physical fitness and risk of myocardial infarction. Advances in Cardiology, 18, 217-230. 1976.

WILLIAMS, R. Physiological mechanisms underlying the association between psychological factors and coronary disease. In Gentry, W., and Williams, R.

(Eds) Psychological aspects of myocardial infarction and coronary care. St. Louis, C.V. Mosby, 1975. p.37-50.

WINER, B. Statistical principles in experimental design. New York, Mc Graw Hill, 1962. p.98.

WOLF, S. Psychosocial forces in myocardial infarction and sudden death. Circulation, 39 and 40, Supplement 4, 74-81, 1969.

WYNN, A. Unwarranted emotional distress in men with ischemic heart disease. Medical Journal of Australia, 2, 847-851. 1967.

LIST OF APPENDICES

APPENDIX ONE

University of Canterbury
Post Graduate Research in Psychology

Dear Sir/Madam,

I am a post graduate student in Psychology at the University of Canterbury. This questionnaire is a vital part of a Masters thesis that is presently being researched. It is a frank appeal for your co-operation on a matter about which only you can help by adding additional information to already existing data on the possible causes of coronary heart disease.

There are three things you should know about this questionnaire. The first is that it is a genuine attempt at unbiased research, and it is not affiliated in any way with any political, governmental, public or student action group. Secondly, complete anonymity will be maintained - you were chosen randomly and I do not know or require to know your name, furthermore, once all the responses have been analysed for the purpose of this thesis all the questionnaire will be destroyed. Thirdly, there is not necessarily any right or wrong answers to the questions and it is only imperative you answer them as honestly as you can.

Thank you for your cooperation.

C.J. Marquand

When you have completed this questionnaire would you please enclose it in the envelope provided and post it. It would be appreciated if you would complete it and return it within seven days.

AN INVESTIGATION OF THE PSYCHOLOGICAL AND PSYCHOSOCIAL CORRELATES OF BEHAVIOUR PATTERNS ASSOCIATED WITH CORONARY HEART DISEASE.

SECTION ONE

This section of the questionnaire concerns some general questions related to your lifestyle.

ALL THE INFORMATION YOU GIVE IS CONFIDENTIAL.

NUMBER _____ AGE _____

SEX _____ MARITAL STATUS _____

RACE (Please answer; Europeon, Maori or other specifying. For statistical purposes a Maori is defined as being half or more Maori)

_____

FAMILY HISTORY

Have you ever suffered from a coronary heart attack (myocardial Infarction) _____

Have any of your family ever suffered from one (mother, father, brother or sister) If yes, please specify. _____

POSITION IN FAMILY (First, second or third child etc..) _____

CIGARETTE SMOKING

Do you smoke? _____

How many cigarettes do you smoke a day? _____

How many years have you smoked? _____

If you have given up smoking:

How many cigarettes a day did you smoke? _____

For how many years did you smoke? _____

How many years (months) have you stopped? _____

EXERCISE

This refers to vigorous exercise such as swimming, keep fit exercises, tennis, running, cycling or similar activity for at least 30 minutes.

Never _____

Moderate (three times a week) _____

Heavy (every day) _____

For the following questions please place a tick in the appropriate line.

EDUCATION

Completed Primary School _____
Two years Secondary Schooling _____
Three or more years Secondary Schooling _____
Some University or Tertiary education _____
University or Tertiary Degree or Diploma _____

OCCUPATION

Professional - executive _____
Proprietor - small business _____
Skilled worker - tradesman _____
Unskilled - labourer _____
Housewife _____
Retired _____
Unemployed _____

ECONOMIC STATUS

Do you earn:-
Less than $1000 a year _____
$1000 - $3000 _____
$3000 - $6000 _____
$6000 - $9000 _____
$9000 - $12000 _____
$12000 - $15000 _____
Over $15000 a year _____

ASSETS

Do you:
Own your own home _____
Own your own car _____
Own your own television _____
Own a caravan or boat _____

SOCIAL GROUP MEMBERSHIP
I am active in social groups _____
I am active in one social group _____
I do not belong to any social group _____

FRIENDSHIP

I have many close friends _____
I have some close friends _____
I have no close friends _____

RECENT EVENTS (STRESS)

Have you in the last twelve months:

Changed your job? _____
Increased or decreased your income substantially? _____
Suffered a major personal illness or injury? _____
Suffered the death of a family member, close relative or friend? _____
Suffered marital or any family conflict? _____
Suffered any other event of major personal consequence? _____

DRINKING HABITS

Place a tick in the appropriate colomn(s)

	Beer	Wine	Spirits
Not at all	_____	_____	_____
Occasionally	_____	_____	_____
Three times a week	_____	_____	_____
Daily	_____	_____	_____

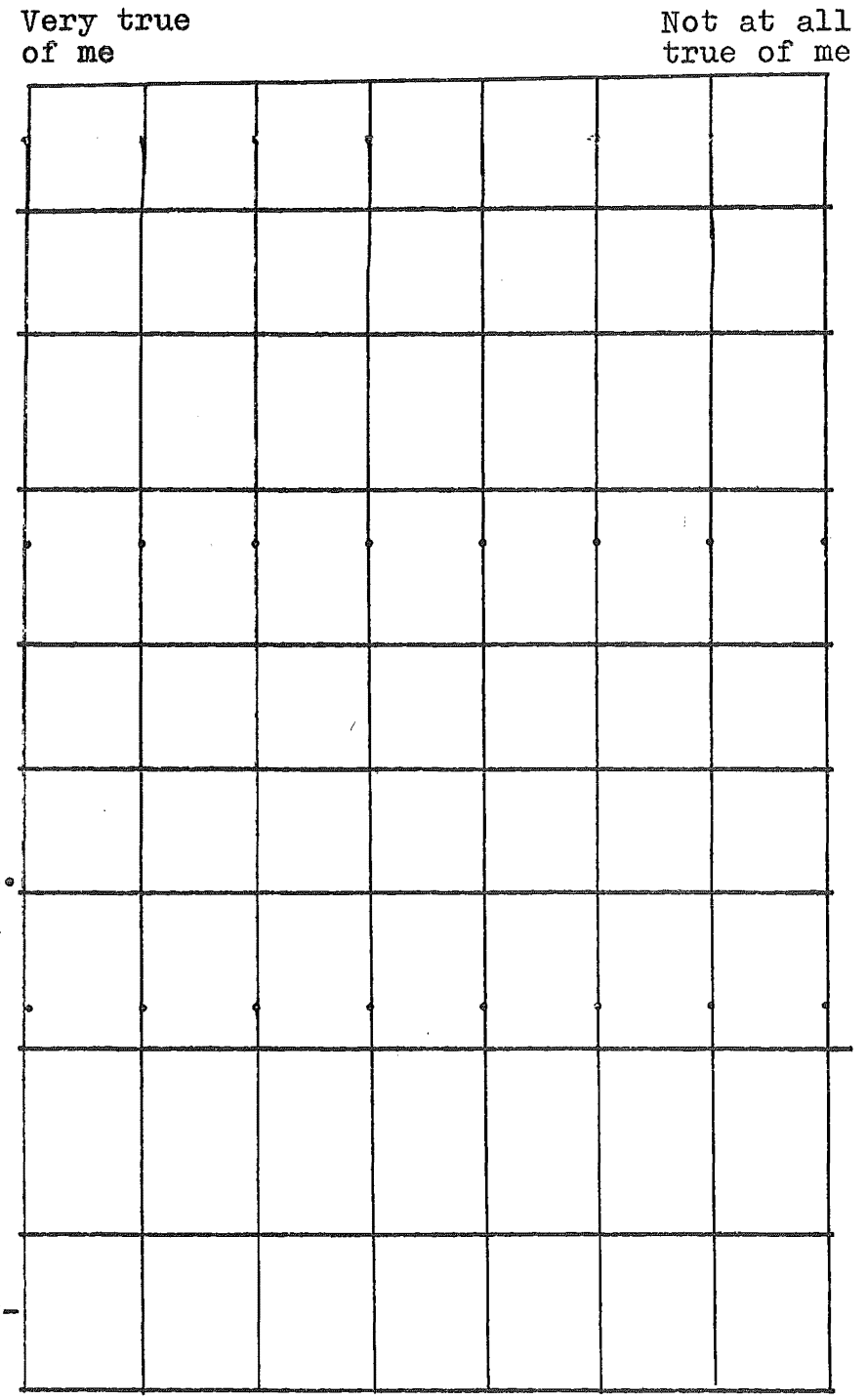
SECTION TWO

Would you now please complete the four self rating scales as directed overleaf. This section of the questionaire is concerned with certain aspects of everyday behaviour. Please answer these questions based on your average habits, feelings or behaviour over the past 12-24 months, rather than how you actually feel at the moment.

Thank you for the time you have spent in answering this questionaire.

VICKERS RATING SCALE

For each of the questions below please indicate on the seven point scale how you would rate yourself.



BORTNER RATING SCALE

Each of us belongs somewhere along the line between two extremes. For example, most of us are neither the most competitive nor the least competitive person we know. What I would like you to do is to mark with a cross where you think you belong between these two extremes.

1.	Never late	_____	Casual about appointments
2.	Not competitive	_____	Very competitive
3.	Anticipates what others are going to say (nods, interups, finishes for them.	_____	Good listener, hears others out
4.	Always rushed	_____	Never feels rushed, even under pressure
5.	Can wait patiently	_____	Impatient when waiting
6.	Goes 'all out'	_____	Casual
7.	Takes things one at a time	_____	Tries to do many things at once, thinks about what he's going to do next.
8.	Emphatic in speech (May pound desk)	_____	Slow deliberate talker
9.	Wants good job recognised by others	_____	Only cares about satisfying himself, no matter what others may think.
10.	Fast (eating, walking etc)	_____	Slow doing things
11.	Easy going	_____	Hard driving
12.	'Sits' on feelings	_____	Expresses feelings
13.	Many interests	_____	Few interests outside work
14.	Satisfied with job	_____	Ambitious

Bendig Scale

Please answer each of the following questions by indicating your answer beside each as either yes or no.

1. I get upset easily _____
2. I feel restless and tense _____
3. I do become impatient easily _____
4. I am always in a hurry _____
5. I am a high strung person _____
6. I get nervous if I sit a lot _____
7. I am usually worrying about something _____
8. I am feeling I am not getting ahead fast enough _____
9. I feel I am always trying to meet deadlines _____
10. I feel like I am pushing myself all the time to get things done in a hurry _____

Welsh Scale

Please answer each of the following questions by indicating your answer beside each as either yes or no.

1. I feel useless _____
2. I get tired for no reason _____
3. I have a good appetite _____
4. I am hopeful about the future _____
5. I feel that others would be better off if I were dead _____
6. I have trouble sleeping at night _____
7. I think about myself a lot _____
8. Every day seems exactly the same _____
9. Life seems dull to me _____
10. I am usually bored _____
11. In thinking of my life I often wonder why I exist _____
12. I feel down in the dumps _____
13. I awake in the morning feeling tired _____
14. I prefer to be by myself most of the time _____
15. I just don't seem to have the energy to do things _____

APPENDIX TWO

University of Canterbury
Post Graduate Research in Psychology

Dear Sir/Madam,

Approximately ten days ago, all persons registered on the Rolleston Electoral Roll were sent out survey material investigating the psychological and psychosocial correlates of behaviour patterns that may be associated with coronary heart disease.

If you have not yet returned this questionnaire I would very much appreciate it if you could take a few minutes to fill this out and return it within the next couple of days as I am anxious to gain as many returns as possible to increase the reliability of any findings I may come up with.

I would like to remind you that your reply will be completely anonymous, but if for any reason you really do not wish to participate in the survey, would you please return the blank questionaire in the envelope that was initially provided. If however, you have just put off doing it, or overlooked it, I would very much appreciate it if you would give your prompt attention to the matter.

Once again, thank you for your co-operation,

Yours sincerly

C.J. Marquand.

APPENDIX THREE Scoring system

AN INVESTIGATION OF THE PSYCHOLOGICAL AND PSYCHOSOCIAL CORRELATES OF BEHAVIOUR PATTERNS ASSOCIATED WITH CORONARY HEART DISEASE.

SECTION ONE

This section of the questionnaire concerns some general questions related to your lifestyle.

ALL THE INFORMATION YOU GIVE IS CONFIDENTIAL.

NUMBER Became 1 - 260 AGE Recorded

SEX Recorded MARITAL STATUS Married/Single

RACE (Please answer; Europeon, Maori or other specifying. For statistical purposes a Maori is defined as being half or more Maori)

Discarded

FAMILY HISTORY

Have you ever suffered from a coronary heart attack (Myocardial Infarction) *

Have any of your family ever suffered from one (mother, father, brother or sister) If yes, please specify. M,F,B,S.

POSITION IN FAMILY (First, second or third child etc.) Recorded

CIGARETTE SMOKING

Do you smoke?	Never (-)
How many cigarettes do you smoke a day?	Given up (G)
How many years have you smoked?	Smokes (S)

If you have given up smoking:

How many cigarettes a day did you smoke?	Discarded
For how many years did you smoke?	
How many years (months) have you stopped?	

EXERCISE

This refers to vigorous exercise such as swimming, keep fit exercises, tennis, running, cycling or similar activity for at least 30 minutes.

Never	Never
Moderate (three times a week)	Moderate
Heavy (every day)	Heavy

Data Recorded

For the following questions please place a tick in the appropriate line.

EDUCATION

Completed Primary School	1
Two years Secondary Schooling	2
Three or more years Secondary Schooling	3
Some University or Tertiary education	4
University or Tertiary Degree or Diploma	5

OCCUPATION

Professional - executive	7
Proprietor - small business	6
Skilled worker - tradesman	5
Unskilled - labourer	4
Housewife	3
Retired	2
Unemployed	1

ECONOMIC STATUS

Do you earn:-

Less than $1000 a year	1
$1000 - $3000	2
$3000 - $6000	3
$6000 - $9000	4
$9000 - $12000	5
$12000 - $15000	6
Over $15000 a year	7

ASSETS

Do you:

Own your own home	1
Own your own car	1
Own your own television	1
Own a caravan or boat	1

SOCIAL GROUP MEMBERSHIP

I am active in social groups	3
I am active in one social group	2
I do not belong to any social group	1

FRIENDSHIP

I have many close friends	3
I have some close friends	2
I have no close friends	1

Possible Score 29

RECENT EVENTS (STRESS)

Have you in the last twelve months:

Changed your job?	1
Increased or decreased your income substantially?	1
Suffered a major personal illness or injury?	1
Suffered the death of a family member, close relative or friend?	1
Suffered marital or any family conflict?	1
Suffered any other event of major personal consequence?	1

Possible score 6

DRINKING HABITS

Place a tick in the appropriate colomn(s)

	Beer	Wine	Spirits
Not at all			=
Occasionally			0
Three times a week			T
Daily			D

Data recorded at highest.

SECTION TWO

Would you now please complete the four self rating scales as directed overleaf. This section of the questionnaire is concerned with certain aspects of everyday behaviour. Please answer these questions based on your average habits, feelings or behaviour over the past 12-24 months, rather than how you actually feel at the moment.

Thank you for the time you have spent in answering this questionaire.

VICKERS RATING SCALE

Possible Score 63

For each of the questions below please indicate on the seven point scale how you would rate yourself.

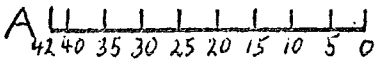
	Very true of me						Not at all true of me
I hate giving up before I'm absolutely sure that I'm licked.	7	6	5	4	3	2	1
I've often been asked to be an officer of some group or groups	7	6	5	4	3	2	1
Sometimes I feel like I shouldn't be working so hard but something drives me on.	7	6	5	4	3	2	1
I thrive on challenging situations. The more challenges I have the better.	7	6	5	4	3	2	1
In comparison to most people I know, I'm very involved in my work.	7	6	5	4	3	2	1
It seems as if I need 30 hours a day to finish all the things I'm faced with.	7	6	5	4	3	2	1
In general, I approach my work much more seriously than most of the people I know.	7	6	5	4	3	2	1
I guess there are people who can be nonchalant or easy going about their work but I am not one of them.	7	6	5	4	3	2	1
My achievements are considered to be significantly higher than those of most people I know.	7	6	5	4	3	2	1

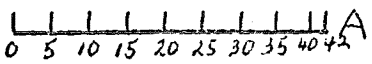
A1	Fully developed	47 - 63
A2	Incompletely developed	32 - 46
B3	Incompletely developed	17 - 31
B4	Fully developed	1 - 16

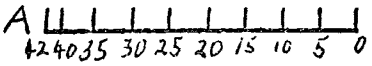
BORTNER RATING SCALE

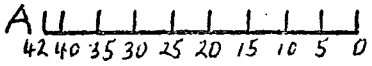
Possible Score 588

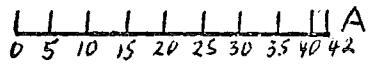
Each of us belongs somewhere along the line between two extremes. For example, most of us are neither the most competitive nor the least competitive person we know. What I would like you to do is to mark with a cross where you think you belong between these two extremes.

1. Never late .  Casual about appointments

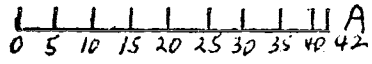
2. Not competitive  Very competitive

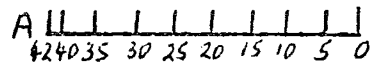
3. Anticipates what others are going to say (nods, interups, finishes for them.  Good listener, hears others out

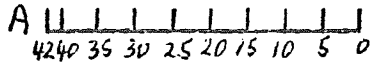
4. Always rushed  Never feels rushed, even under pressure

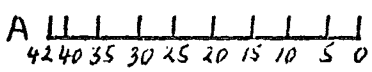
5. Can wait patiently  Impatient when waiting

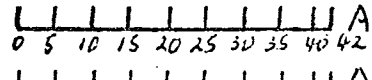
6. Goes 'all out'  Casual

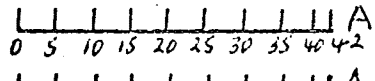
7. Takes things one at a time  Tries to do many things at once, thinks about what he's going to do next.

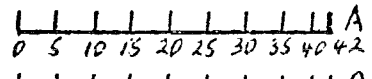
8. Emphatic in speech (May pound desk)  Slow deliberate talker

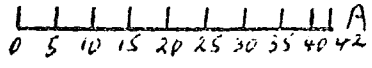
9. Wants good job recognised by others  Only cares about satisfying himself, no matter what others may think.

10. Fast (eating, walking etc)  Slow doing things

11. Easy going  Hard driving

12. 'Sits' on feelings  Expresses feelings

13. Many interests  Few interests outside work

14. Satisfied with job  Ambitious

A1	Fully developed	442 - 588
A2	Incompletely developed	295 - 441
B3	Incompletely developed	148 - 294
B4	Fully developed	1 - 147

Gradations marked in millimeters

Bendig Scale

Possible Score 10

Please answer each of the following questions by indicating your answer beside each as either yes or no.

1.	I get upset easily	1
2.	I feel restless and tense	1
3.	I do become impatient easily	1
4.	I am always in a hurry	1
5.	I am a high strung person	1
6.	I get nervous if I sit a lot	1
7.	I am usually worrying about something	1
8.	I am feeling I am not getting ahead fast enough	1
9.	I feel I am always trying to meet deadlines	1
10.	I feel like I am pushing myself all the time to get things done in a hurry	1

Welsh Scale

Possible Score 15

Please answer each of the following questions by indicating your answer beside each as either yes or no.

1.	I feel useless	1
2.	I get tired for no reason	1
3.	I have a good appetite	1
4.	I am hopeful about the future	1
5.	I feel that others would be better off if I were dead	1
6.	I have trouble sleeping at night	1
7.	I think about myself a lot	1
8.	Every day seems exactly the same	1
9.	Life seems dull to me	1
10.	I am usually bored	1
11.	In thinking of my life I often wonder why I exist	1
12.	I feel down in the dumps	1
13.	I awake in the morning feeling tired	1
14.	I prefer to be by myself most of the time	1
15.	I just don't seem to have the energy to do things	1

APPENDIX FOUR

RAW DATA OBTAINED FROM EACH RESPONDENT

Number	Vickers	Type	Bortner	Type	Anxiety	Depression	Age	Marital Status	Family History	Position in Family	Assets	Smoking	Exercise	Stress	Alcohol
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
1	37	A2	282	B3	5	2	28	S	-	2	17	-	M	1	0
2	47	A1	211	B3	0	0	31	M	-	1	13	-	N	0	-
3	26	B3	307	A2	2	1	26	M	-	1	16	G	N	4	0
4	27	B3	295	A2	0	0	33	M	-	1	13	S	N	2	0
5	37	A2	332	A2	1	3	40	M	F	1	10	-	N	0	0
6	25	B3	255	B3	2	2	36	M	-	1	12	S	M	2	T
7	37	A2	290	B3	2	0	32	M	-	3	16	G	M	0	T
8	36	A2	183	B3	1	0	53	M	F	2	16	S	N	0	D
9	35	A2	351	A2	2	2	23	M	-	3	16	-	M	0	0
10	48	A1	264	B3	0	0	32	M	F	1	15	-	M	0	0
11	45	A2	296	A2	0	1	36	M	-	3	20	S	M	1	0
12	39	A2	342	A2	9	4	56	M	-	1	10	S	N	0	0
13	30	B3	299	A2	2	1	74	M	M	4	12	-	N	0	0
14	45	A2	346	A2	7	9	31	M	-	5	14	-	M	1	T
15	42	A2	304	A2	9	7	37	S	M	3	14	S	M	1	0
16	47	A1	265	B3	4	0	29	M	-	2	22	-	N	1	0
17	32	A2	268	B3	1	1	67	M	-	1	8	-	N	0	D
18	42	A2	279	B3	6	4	24	M	M	2	13	-	M	5	0
19	44	A2	241	B3	2	2	62	M	-	2	9	S	N	0	-

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
20	53	A1	345	A2	6	1	55	M	-	2	11	S	N	1	0
21	44	A2	292	B3	6	8	30	M	-	1	17	S	N	3	-
22	47	A1	375	A2	2	0	36	S	F	1	23	S	M	2	T
23	17	B3	183	B3	1	1	56	M	-	1	9	G	M	0	-
24	38	A2	208	B3	7	2	30	M	-	4	14	-	N	0	-
25	38	A2	264	B3	0	1	42	M	B	11	15	S	M	0	T
26	39	A2	250	B3	3	1	22	M	F	5	12	-	M	1	0
27	47	A1	206	B3	0	0	32	M	-	2	15	S	M	0	0
28	35	A2	294	B3	0	1	21	S	-	2	15	S	N	1	T
29	29	B3	368	A2	9	5	49	M	-	4	15	S	N	2	0
30	37	A2	280	B3	1	0	31	M	-	1	16	-	M	0	0
31	31	B3	239	B3	2	1	31	M	-	1	14	-	M	1	0
32	45	A2	304	A2	7	7	27	M	-	2	14	-	M	0	-
33	49	A1	223	B3	5	0	49	M	F	2	22	-	N	0	0
34	35	A2	225	B3	0	0	51	S	-	1	17	-	M	4	0
35	40	A2	290	B3	3	0	29	M	-	2	27	G	M	1	0
36	44	A2	312	A2	1	0	24	M	M	3	20	S	M	0	0
37	21	B3	288	B3	2	3	62	M	-	1	12	G	N	0	0*
38	56	A1	401	A2	7	3	50	M	F	1	16	-	N	0	0
39	54	A1	363	A2	4	1	59	M	-	3	15	-	M	1	0
40	37	A2	220	B3	0	0	34	M	-	3	13	-	N	0	0
41	44	A2	332	A2	4	3	27	M	-	1	24	-	N	2	0
42	50	A1	341	A2	3	3	45	M	-	1	16	G	H	1	-
43	30	B3	298	A2	4	0	34	M	-	1	19	S	M	2	0
44	48	A1	292	B3	2	2	56	M	M/F	1	16	-	N	0	0

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
45	44	A2	231	B3	0	0	58	M	M	2	15	-	M	0	0
46	39	A2	174	B3	1	4	51	M	-	1	14	-	M	1	0
47	57	A1	213	B3	1	1	30	M	-	4	16	S	M	2	0
48	27	B3	271	B3	3	1	29	M	-	1	15	-	N	2	0
49	27	B3	203	B3	4	5	37	M	-	2	14	-	N	0	-
50	52	A1	261	B3	0	0	30	M	-	3	14	G	N	0	0
51	39	A2	420	A2	7	1	29	M	F	4	14	S	M	1	0
52	48	A1	321	A2	2	0	35	M	-	1	21	-	H	0	0
53	27	B3	337	A2	5	4	39	M	F	1	13	-	N	0	0
54	33	A2	255	B3	0	0	28	M	-	5	15	-	N	0	-
55	33	A2	291	B3	0	0	62	S	-	4	15	-	N	0	-
56	33	A2	271	B3	2	1	75	M	M/S	1	13	-	H	0	0
57	55	A1	282	B3	2	0	29	M	F	1	22	-	M	1	0
58	49	A1	407	A2	4	3	24	S	-	1	20	S	N	3	0
59	15	B4	232	B3	5	8	61	M	-	5	12	S	N	1	0
60	49	A1	291	B3	1	2	57	M	-	5	18	-	N	1	0
61	46	A2	264	B3	2	0	37	M	M/F	1	19	-	N	2	0
62	34	A2	243	B3	2	1	23	S	-	1	18	-	N	2	0
63	48	A1	287	B2	0	1	31	S	-	1	22	S	M	0	-
64	42	A2	298	A2	3	0	56	S	-	4	16	-	M	1	0
65	28	B3	281	B3	1	2	22	S	-	1	20	-	M	1	0
66	44	A2	263	B3	0	0	49	M	-	1	16	G	M	0	0
67	44	A2	292	B3	4	4	45	M	-	1	21	-	N	0	T
68	23	B3	90	B3	0	3	26	M	-	3	13	-	M	0	0
69	17	B3	280	B3	1	0	37	M	-	1	14	S	M	0	D

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
70	50	A1	383	A2	7	0	44	M	-	2	18	S	M	0	-
71	56	A1	335	A2	1	0	50	M	-	1	12	S	N	4	-
72	33	A2	256	B3	3	4	64	M	M	1	13	S	N	2	0
73	25	B3	247	B3	2	0	45	M	M	1	17	S	N	1	0
74	42	A2	247	B3	1	0	41	M	M	4	22	-	N	0	0
75	33	A2	341	A2	0	1	28	M	M/F	3	20	-	N	2	0
76	40	A2	305	A2	7	4	26	M	-	2	19	S	M	1	0
77	27	B3	313	A2	1	0	70	M	-	2	16	-	M	1	0
78	20	B3	231	B3	2	0	22	M	F	1	19	-	N	1	-
79	52	A1	209	B3	2	1	34	M	-	2	23	-	N	0	0
80	37	A2	393	A2	4	2	28	M	-	1	13	S	M	0	0
81	42	A2	321	A2	10	5	34	M	-	1	12	S	N	0	0
82	48	A1	339	A2	7	7	33	M	-	3	13	-	N	2	0
83	30	B3	245	B3	0	0	51	M	-	2	11	-	N	0	T
84	50	A1	371	A2	8	1	30	M	-	1	14	G	N	1	0
85	32	A2	311	A2	0	0	32	M	F	1	14	-	N	0	0
86	54	A1	304	A2	4	1	33	S	F	2	23	-	M	0	0
87	30	B3	235	B3	0	1	34	M	-	2	20	-	N	4	0
88	50	A1	232	B3	3	3	51	M	-	3	17	-	N	2	0
89	48	A1	263	B3	1	2	28	S	F	2	21	-	M	1	0
90	57	A1	373	A2	7	6	26	S	-	2	22	-	M	1	T
91	34	A2	220	B3	0	0	20	S	-	1	22	-	H	0	T
92	45	A2	290	B3	0	0	24	S	-	2	20	-	M	0	0
93	45	A2	322	A2	5	1	27	M	-	2	14	-	N	0	0
94	24	B3	206	B3	5	8	33	S	-	1	14	-	N	1	D
95	38	A2	291	B3	0	0	32	M	-	1	17	S	N	0	-

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
96	58	A1	352	A2	6	1	29	M	-	2	19	S	N	0	0
97	11	B4	223	B3	1	3	46	M	-	7	9	S	N	0	-
98	35	A2	296	A2	1	1	27	M	-	3	13	-	N	2	0
99	29	B3	316	A2	0	2	26	S	-	3	22	-	M	0	0
100	32	B3	378	A2	6	6	25	M	-	4	12	S	M	0	0
101	54	A1	383	A2	9	10	35	M	-	2	18	S	N	2	0
102	17	B3	404	A2	4	11	18	S	-	6	9	S	M	1	0
103	45	A2	364	A2	5	3	32	S	-	1	11	-	M	3	0
104	30	B3	382	A2	6	12	28	M	M	4	13	S	M	4	0
105	44	A2	328	A2	4	1	27	M	-	1	19	-	M	2	0
106	41	A2	281	B3	2	0	19	S	-	2	9	S	M	0	0
107	38	A2	296	A2	2	0	33	M	-	3	15	-	N	0	0
108	21	B3	168	B3	0	0	55	M	M	4	13	S	M	0	0
109	33	A2	220	B3	0	0	28	M	-	1	17	-	N	0	0
110	57	A1	374	A2	3	0	42	M	-	2	11	-	N	0	-
111	28	B3	314	A2	2	0	48	M	-	4	15	-	N	0	0
112	32	A2	258	B3	0	0	30	M	-	1	19	S	M	0	0
113	17	B3	204	B3	0	0	22	M	-	3	18	-	N	0	0
114	36	A2	303	A2	2	0	27	M	M	1	16	-	N	2	T
115	47	A1	321	A2	8	1	66	M	B	1	14	G	M	2	0
116	54	A1	332	A2	7	6	26	S	-	3	12	-	N	-	0
117	42	A2	281	B3	4	10	42	S	F	1	22	S	M	3	0
118	45	A2	346	A2	0	0	47	S	-	1	23	-	N	0	0
119	46	A2	312	A2	0	0	27	M	-	1	17	-	N	1	-
120	35	A2	289	B3	2	1	23	M	-	4	18	S	M	2	T

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
121	33	A2	313	A2	3	2	21	S	-	2	8	-	M	0	-
122	39	A2	338	A2	2	2	18	S	-	1	9	-	M	0	-
123	46	A2	279	B3	1	0	64	M	-	1	15	-	M	0	-
124	50	A1	361	A2	1	0	44	M	-	1	16	-	M	1	0
125	50	A1	390	A2	6	5	33	M	-	1	17	S	M	0	D
126	33	A2	248	B3	0	0	31	S	-	1	20	G	M	0	0
127	30	B3	377	A2	6	8	33	M	-	1	16	S	N	2	0
128	35	A2	297	A2	0	1	38	M	-	1	17	-	M	1	-
129	38	A2	297	A2	0	0	34	M	-	2	22	-	M	1	-
130	57	A1	327	A2	5	3	48	M	-	2	14	G	M	0	T
131	55	A1	332	A2	6	0	26	M	-	2	21	G	M	2	0
132	29	B3	254	B3	5	1	26	M	F	3	13	-	N	1	-
133	28	B3	255	B3	2	2	31	M	-	1	13	S	N	0	0
134	35	A2	273	B3	2	1	24	M	F	3	15	-	H	0	0
135	31	B3	296	A2	6	8	25	M	-	2	16	-	M	1	-
136	46	A1	236	B3	0	1	57	M	F	1	15	S	N	0	- *
137	44	A2	285	B3	2	2	22	M	-	5	22	-	M	0	-
138	50	A1	288	B3	3	3	59	M	-	3	20	G	N	0	D
139	36	A2	299	A2	1	0	75	M	-	2	15	G	N	0	0
140	39	A2	257	B3	3	2	28	S	-	1	24	-	M	0	0
141	38	A2	261	B3	5	3	52	M	-	2	15	S	N	0	T
142	37	A2	201	B3	3	1	38	M	-	3	23	S	M	0	0
143	39	A2	281	B3	0	7	29	M	F	1	19	S	M	0	0
144	52	A1	386	A2	2	0	32	M	-	2	19	-	M	0	T

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
145	49	A1	398	A2	8	0	33	M	M/F	7	23	G	M	1	0*
146	48	A1	481	A1	10	10	52	M	-	1	20	G	N	1	T
147	12	B4	164	B3	0	0	25	M	-	1	14	S	N	0	0
148	35	A2	338	A2	2	4	52	M	-	4	15	S	N	1	D
149	43	A2	365	A2	4	1	26	M	-	2	17	S	M	1	T
150	54	A1	381	A2	9	2	34	M	-	3	20	-	N	1	0
151	45	A2	365	A2	7	3	26	M	-	4	18	S	M	1	T
152	40	A2	226	B3	2	0	40	M	M	4	13	S	N	1	0
153	40	A2	384	A2	3	6	27	M	-	4	19	-	M	3	0
154	41	A2	378	A2	5	1	29	M	-	3	20	G	M	2	0
155	40	A2	279	B3	0	0	37	M	-	1	21	G	N	0	0
156	39	A2	312	A2	1	0	60	M	-	2	15	G	N	0	D
157	40	A2	288	B3	0	0	29	M	F	3	21	G	M	1	0
158	42	A2	223	B3	0	1	30	M	-	1	17	G	M	1	0
159	53	A1	265	B3	7	8	59	S	-	4	14	G	N	2	0
160	33	A2	273	B3	4	4	62	S	-	1	22	S	H	1	D
161	50	A1	316	A2	2	1	42	S	-	4	20	S	H	0	0
162	33	A2	352	A2	3	3	33	M	-	1	18	S	M	0	0
163	43	A2	309	A2	0	0	34	M	F	1	19	-	M	0	T
164	30	B3	282	B3	1	0	37	M	F/B	6	17	-	M	1	T
165	31	B3	249	B3	0	3	25	S	-	3	19	-	M	1	0
166	43	A2	441	A2	5	4	27	M	-	1	22	-	M	1	0
167	33	A2	357	A2	4	4	20	S	-	2	18	-	N	1	T
168	25	B3	325	A2	1	0	32	M	-	2	17	G	M	0	0
169	47	A1	362	A2	7	1	39	M	F	3	20	S	N	1	T
170	35	A2	292	B3	6	2	40	M	-	1	27	-	M	1	T

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
171	51	A1	234	B3	5	1	53	M	F	2	18	G	N	0	0
172	43	A2	285	B3	3	2	31	M	-	2	23	S	N	3	0
173	52	A1	287	B3	0	0	28	M	-	1	25	-	H	1	0
174	40	A2	297	A2	6	2	31	S	-	1	23	-	N	1	T
175	25	B3	256	B3	1	0	30	M	-	3	24	G	N	0	0
176	46	A2	271	B3	4	0	52	M	F	2	24	G	M	0	0
177	17	B3	206	B3	1	3	72	M	F/B	6	15	-	M	0	0
178	40	A2	325	A2	0	0	29	M	F	2	19	-	N	0	0
179	52	A1	336	A2	7	1	29	M	-	2	21	-	M	1	0
180	47	A1	365	A2	4	3	27	M	-	2	22	-	H	2	0
181	61	A1	254	B3	2	4	28	M	-	2	21	S	M	3	0
182	42	A2	275	B3	5	4	35	M	F	1	18	-	N	0	0
183	53	A1	179	B3	2	1	72	M	F	2	18	S	N	1	0*
184	39	A2	353	A2	2	0	51	M	-	2	24	G	N	0	D
185	42	A2	269	B3	3	1	38	M	-	1	20	G	N	0	0
186	44	A2	301	A2	0	1	34	M	F	2	22	-	M	1	0
187	52	A1	330	A2	0	2	39	M	F	4	20	S	M	0	T
188	37	A2	299	A2	7	1	30	M	-	1	22	-	M	1	T
189	36	A2	281	B3	0	2	21	S	-	3	21	S	H	2	0
190	21	B3	260	B3	0	2	28	M	-	4	20	S	M	0	0
191	36	A2	338	A2	2	3	43	M	-	1	22	-	N	0	0
192	26	B3	241	B3	0	3	29	M	-	2	20	-	M	0	0
193	44	A2	375	A2	1	3	29	M	-	4	20	S	N	0	T
194	13	B4	152	B3	0	7	29	S	-	2	18	S	N	1	0
195	44	A2	236	B3	0	7	30	S	-	3	21	S	N	0	0

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
196	35	A2	359	A2	3	0	22	S	-	3	21	-	M	2	0
197	36	A2	323	A2	0	3	28	M	-	1	21	-	M	N	-
198	37	A2	244	B3	0	0	23	S	-	2	20	S	H	1	0
199	41	A2	169	B3	0	0	34	M	M	5	17	G	M	1	0
200	48	A1	323	A2	6	4	65	M	F	2	12	G	N	0	0
201	46	A2	274	A2	4	5	29	S	-	1	15	S	N	0	0
202	43	A2	303	A2	0	0	49	M	F	4	19	S	N	0	0
203	35	A2	289	B3	0	1	49	M	F	1	20	-	M	0	T
204	42	A2	84	B4	0	2	64	M	-	1	12	S	N	0	D
205	54	A1	246	B3	5	3	32	M	-	5	20	-	N	1	0
206	49	A1	186	B3	1	1	32	M	-	1	18	-	M	2	0
207	51	A1	261	B3	0	1	54	S	-	2	19	S	M	1	D
208	34	A2	310	A2	2	1	33	M	-	3	18	S	N	0	0
209	23	B3	195	B3	0	0	34	M	-	4	17	S	N	2	0
210	25	B3	286	B3	6	4	22	M	-	1	18	G	H	0	T
211	25	B3	257	B3	4	4	69	S	-	4	16	S	N	1	0
212	42	A2	337	A2	2	1	27	M	-	2	19	S	M	0	0
213	43	A2	245	B3	0	3	79	M	-	7	16	-	N	1	0
214	63	A1	477	A1	7	2	45	M	-	3	23	S	N	1	T
215	39	A2	331	A2	5	4	28	M	-	2	24	-	N	2	0
216	39	A2	316	A2	6	5	23	S	-	1	12	-	N	0	0
217	28	B3	401	A2	2	7	29	S	-	1	11	-	M	3	T
218	61	A1	452	A1	7	6	31	S	-	2	21	S	M	1	0
219	20	B3	280	B3	0	0	71	M	-	1	16	-	N	0	-
220	59	A1	375	A2	2	2	36	M	F	2	21	S	H	0	-

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
221	46	A2	323	A2	0	0	37	M	-	2	21	G	M	1	D
222	34	A2	303	B3	6	3	25	S	F	1	19	S	M	4	T
223	28	B3	306	A2	0	3	18	S	-	3	7	S	H	1	0
224	31	B3	386	A2	1	2	48	M	-	1	20	-	M	1	T
225	51	A1	359	A2	7	1	32	S	F	1	24	-	M	0	0
226	47	A1	383	A2	1	1	62	M	-	4	18	S	N	1	0
227	43	A2	373	A2	2	1	32	M	-	1	25	S	H	0	T
228	44	A2	354	A2	6	0	49	M	-	2	22	-	M	1	D
229	31	B3	237	B3	0	1	30	S	-	2	16	S	N	0	0
230	42	A2	320	A2	3	0	30	M	F	2	22	-	M	1	-
231	45	A2	294	B3	2	2	65	M	-	3	13	S	N	2	D
232	41	A2	419	A2	3	0	51	M	F	1	23	G	M	1	T
233	36	A2	385	A2	1	0	25	S	-	1	23	-	M	2	T
234	49	A1	358	A2	2	1	23	S	-	1	23	S	N	0	T
235	47	A1	220	B3	1	1	44	M	F	2	16	S	N	1	D
236	54	A1	345	A2	6	1	70	M	-	1	16	S	N	0	T
237	40	A2	338	A2	3	0	60	M	-	2	21	-	N	1	0
238	29	B3	285	B3	3	7	37	M	-	2	18	-	N	1	0
239	46	A2	255	B3	2	0	29	M	-	2	25	-	N	0	T
240	52	A1	353	A2	3	0	28	M	-	1	24	-	M	0	0
241	29	B3	262	B3	0	1	26	M	-	4	18	-	M	1	0
242	47	A1	344	A2	2	1	27	M	F	3	19	-	M	1	+
243	34	A2	336	A2	4	2	57	M	F	7	16	-	N	0	0
244	40	A2	252	B3	3	1	51	M	-	1	13	-	H	1	0
245	32	A2	274	B3	3	3	29	M	-	1	22	G	M	1	T

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
246	42	A2	285	B3	2	2	24	S	-	3	19	S	N	1	T
247	48	A1	409	A2	6	1	39	M	-	2	20	-	M	2	D
248	32	A2	321	A2	0	7	58	M	-	1	13	S	N	0	0
249	52	A1	491	A1	8	4	37	M	-	3	20	S	N	3	T
250	38	A2	300	A2	1	2	32	M	-	1	24	-	N	2	0
251	42	A2	345	A2	1	0	30	M	-	2	22	S	M	0	T
252	44	A2	284	B3	0	1	26	M	-	2	18	G	H	1	T
253	45	A2	239	B3	1	0	35	S	-	1	21	-	N	0	D
254	48	A1	254	B3	3	0	60	M	-	7	15	-	N	1	-
255	53	A1	294	B3	3	2	56	M	M	2	18	S	N	1	0
256	40	A2	267	B3	0	2	34	S	-	2	23	G	M	0	T
257	42	A2	333	A2	3	1	36	M	-	3	18	G	N	2	-
258	45	A2	270	B3	5	0	50	M	-	3	18	S	N	0	T*
259	42	A2	265	B3	0	1	40	M	M	8	17	S	M	2	0
260	47	A1	258	B3	2	1	54	M	M	7	19	G	N	1	0

* Respondent has actually had a MI.

Numbers 1 - 135 Females

Numbers 136 - 260 Males

For key to a - p code, see appendix 3.

APPENDIX FIVE

RAW DATA FOR A/B COMPARISONS

T TEST FOR ANXIETY

Type A

10	7	7	8	2	4	6	0	0	10	0
7	1	7	0	2	2	8	5	1	0	0
6	3	9	4	6	0	2	7	1	6	7
5	2	4	9	6	8	0	6	1	2	2
2	0	4	2	9	6	9	5	7	9	7
6	1	4	3	2	7	5	5	2	4	6
1	0	4	4	2	0	3	2	3	1	4
3	0	7	7	2	5	1	2	2	4	2
5	8	1	6	4	7	7	3	3	0	6
3	7	0	0	1	1	3	7	2	0	2
4	6	7	1	2	3	1	6	0	3	
2	4	1	3	6	0	1				

Type B

0	5	4	1	6	0	0	2	5	2	0
0	3	2	0	0	0	1	2	0	1	0
2	0	4	4	5	4	1	1	1	2	2
6	2	1	5	2	2	0	2	6	0	5
3	1	1	2	0	7	0	2	0	0	4
0	0	3	0	2	0	0	1	3	0	0
3	3	0	1	2	5	0	2	1	3	0
5	2	0	5	0	2	0	1	3	0	2
0	2	0	0	0	0	3	0	6	2	1
0	4	0	0	7	0	1	0	4	0	1

5 1 6 3 0 0 0 2 1 3 2

0 3 3 2 0 1 3 3 0 5 0

2

T TEST FOR DEPRESSION

Type A

10 2 6 4 1 2 8 2 0 5 1

1 3 7 0 3 2 1 3 3 1 0

0 0 4 1 8 3 1 6 0 4 9

1 0 5 7 1 0 0 1 1 4 1

0 2 1 1 5 6 2 4 7 10 3

5 0 11 6 7 3 3 1 2 1 12

0 0 3 1 1 3 3 0 3 2 0

0 0 1 1 0 4 1 0 0 4 0

4 1 0 0 3 6 1 0 0 0 2

0 0 0 1 0 0 2 3 1 1 2

0 1 4 0 0 0 0 5 1 0 1

2 1 7 2 0 1

Type B

2 2 5 3 2 0 0 0 1 2 0

0 2 0 0 0 0 0 1 0 0 0

0 0 0 0 8 10 3 1 2 1 4

4 0 0 4 2 1 0 1 8 1 1

1 1 2 2 2 2 0 1 2 1 4

1 3 1 3 2 7 0 0 3 7 1

4 2 0 0 0 3 0 1 0 1 1

0 0 7 3 0 1 0 1 0 0 0

1 3 1 0 0 0 3 0 4 2 2

1 4 0 0 8 3 4 0 4 0 1

8 0 3 1 0 3 1 2 1 7 0

1 1 3 2 1 0 0 2 2 0 1

1

T TEST FOR AGE

Type A

29 52 45 31 26 28 33 30 33 34 38

43 40 33 34 29 23 30 26 22 36 32

25 28 56 33 75 29 74 26 32 49 31

27 33 33 37 29 52 27 55 27 26 28

36 26 34 23 49 25 26 29 27 35 27

36 24 18 29 27 50 32 60 18 59 28

42 48 27 27 33 32 45 33 34 62 34

42 27 32 29 48 20 49 35 27 22 30

39 66 39 51 24 36 31 25 56 47 29

23 44 27 29 70 50 21 27 60 28 18

51 28 26 44 34 27 70 33 39 57 39

58 32 30 36 37 54

Type B

64 28 30 19 40 31 28 55 53 36 62

28 31 32 75 30 28 53 29 22 30 32

61 42 52 67 57 23 72 24 37 64 28

62 23 31 35 30 31 48 72 56 22 26

38 30 49 31 21 42 45 24 28 22 26

57 29 32 37 22 29 21 64 59 30 31

45 28 23 31 41 52 34 49 22 38 65

51 34 29 49 29 51 25 32 62 34 40

32 34 51 37 54 56 28 29 34 58 20

30 22 51 24 59 69 30 33 62 79 29

32	37	71	37	46	25	25	30	65	44	37
29	26	51	29	24	36	35	60	56	34	50
40										

T TEST FOR ASSETS

Type A

20	22	21	20	16	13	16	20	13	12	17
22	10	13	22	22	16	14	14	20	20	14
21	21	10	23	16	21	12	22	15	12	14
14	19	15	14	19	23	19	11	13	15	18
23	22	17	19	15	12	20	24	14	18	18
12	20	9	19	11	16	11	20	21	15	13
15	21	24	19	20	7	16	15	18	20	9
11	19	24	14	15	22	18	21	16	18	25
13	14	17	22	20	12	20	22	16	23	23
23	18	17	19	23	12	8	21	23	20	9
22	16	19	16	24	21	16	17	22	24	19
16	20	13	24	22	18					

Type B

12	17	14	9	27	13	14	9	18	12	15
13	23	16	15	17	25	16	13	19	24	15
22	18	24	22	12	22	15	8	18	18	21
13	19	15	18	9	22	20	18	17	18	13
20	9	20	13	21	14	16	15	20	15	21
15	20	12	13	22	18	15	14	20	21	15
13	24	20	16	17	15	17	14	22	23	20
22	19	19	20	17	23	14	18	23	11	13
19	12	20	21	17	13	17	21	18	16	21

17	16	15	22	14	16	14	20	22	16	16
14	17	19	15	17	19	16	13	16	18	25
18	13	22	19	18	21	15	18	23	18	17
19										

APPENDIX SIX

RAW DATA FOR SEX COMPARISONS

T TEST FOR SEX. (BORTNER SCALE)

Females

307	295	332	351	296	434	299	346	304
345	375	368	304	312	401	363	332	341
298	420	321	337	407	298	383	335	341
305	313	393	321	339	371	311	304	273
322	352	296	316	378	383	404	364	382
328	296	374	314	303	321	332	346	312
313	338	361	390	377	297	297	327	332
296	282	211	255	290	183	264	265	268
279	241	292	183	208	264	250	206	294
280	239	223	225	290	288	220	292	231
174	213	271	203	261	255	291	271	282
232	291	264	243	287	281	263	292	90
280	256	247	247	231	209	245	235	232
263	220	290	206	291	223	281	168	220
258	204	281	289	279	248	254	255	273

Males

299	386	398	481	338	365	381	365	384
378	312	316	352	309	441	357	325	362
297	325	336	365	353	301	330	299	338
375	359	323	323	274	303	310	337	477
331	316	401	452	375	323	306	386	359
383	373	354	320	419	385	358	345	338

353	344	336	409	321	491	300	236	285
288	257	261	201	281	164	226	279	288
223	265	273	282	249	292	234	285	287
256	271	206	254	275	179	269	281	260
241	152	236	244	169	289	84	246	186
261	195	286	257	245	280	203	237	294
220	285	255	262	252	274	285	284	239
254	294	267	270	265	258	345	333	

T TEST FOR ANXIETY

Females

5	0	2	0	1	2	2	1	2	0	0	9	2
7	9	4	1	6	2	6	6	2	1	7	0	3
0	0	9	1	2	7	5	0	3	1	2	7	4
0	4	3	4	2	0	1	1	3	4	0	7	2
5	0	0	2	2	4	5	1	2	2	0	3	1
0	4	0	1	7	1	3	2	1	0	7	1	2
2	4	10	7	0	8	0	4	0	3	1	7	0
0	5	5	0	6	1	1	0	6	9	4	5	6
4	2	2	0	0	3	2	0	0	2	8	7	4
0	0	2	3	2	1	1	6	0	6	0	0	5
6	5	2	2	6								

Males

0	2	3	1	3	5	3	0	2	8	10	0	2
4	9	7	2	3	5	0	1	0	0	7	4	2
3	0	1	0	5	4	1	7	6	5	3	0	6
1	4	1	0	7	4	2	5	2	2	3	0	0

7 0 0 2 0 1 0 0 3 0 0 0 6

4 0 0 0 5 1 0 2 0 6 4 2 0

7 5 6 2 7 0 2 0 6 0 1 7 1

2 6 0 3 2 3 1 2 1 6 3 3 2

3 0 2 4 3 3 2 6 0 8 1 1 0

1 3 3 0 3 5 0 2

T TEST FOR DEPRESSION

<u>Females</u>

2 0 1 0 3 2 0 0 2 0 1 4 1

9 7 0 1 4 2 1 8 0 1 2 1 1

0 1 5 0 1 7 0 0 0 0 3 3 1

0 3 3 0 2 0 4 1 1 5 0 1 0

4 0 0 1 0 3 8 2 0 1 1 0 2

0 4 3 0 0 0 4 0 0 1 4 0 0

1 2 5 7 0 1 0 1 1 3 2 6 0

0 1 8 0 1 3 1 2 6 10 11 3 12

1 0 0 0 0 0 0 0 0 0 1 6 10

0 0 1 2 2 0 0 5 0 8 1 0 3

0 1 2 1 8

<u>Males</u>

1 2 3 0 2 3 1 7 0 0 10 0 4

1 2 3 0 6 1 0 0 0 1 8 4 1

3 0 0 3 4 4 0 1 2 1 2 0 2

0 0 3 0 3 4 4 1 0 1 1 2 1

2 2 3 3 3 7 7 0 3 0 0 1 4

5 0 1 2 3 1 1 1 0 4 4 1 3

2 4 5 7 6 0 2 0 3 3 2 1 1

0 0 1 0 2 0 0 1 1 1 0 7 0

0 1 1 2 1 3 2 1 7 4 2 0 1

0 0 2 2 1 0 1 1

APPENDIX SEVEN

RAW DATA FOR CHI SQUARE TESTS

	A1	A2	B3	B4
MARITAL STATUS				
Single	1	24	30	0
Married	3	97	104	1
FAMILY HISTORY				
Positive	0	27	35	0
Negative	4	95	98	1
POSITION IN FAMILY				
First	1	48	53	1
Second	1	42	30	0
Third	2	19	18	0
Fourth	0	11	12	0
Fifth plus	0	7	15	0
SMOKING				
Never	0	64	63	0
Given up	1	16	22	0
Smoker	3	42	48	1
EXERCISE				
Never	3	58	68	1
Moderate	1	60	52	0
Heavy	0	7	10	0

	A1	A2	B3	B4
STRESS				
Nil	0	53	69	1
One	3	41	41	0
Two	0	21	15	0
Three	1	5	3	0
Four	0	3	3	0
Five	0	0	1	0
Six	0	0	0	0
ALCOHOL				
Never	0	16	19	0
Occasionally	1	76	84	0
Three a week	2	24	19	0
Daily	1	7	10	0